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BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

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THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

J. R. SCHRAMM, Editor-in-Chief

National Research Council, Washington, D. C.

Vol. 13

JULY, 1924

No. 7

ENTRIES 4769-5615

AGRONOMY

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MARY R. BURR, *Assistant Editor*

(See also in this issue Entries 4871, 4877, 4890, 4898, 5013, 5077, 5299, 5308, 5449, 5453, 5477, 5483, 5485)

4769. ANONYMOUS. **Championship field wheat competition in the central southwest districts.** Agric. Gaz. New South Wales 35: 77-81. 1924.—Details of judging are given for the 10 entries. The results were based upon parent yield, freedom from disease, condition and appearance, and other characters. In most cases 60 pounds of seed per acre was used with 45-60 pounds of superphosphate. The increasing presence of bunt, take-all and flag-smut are noted. A more diversified system of farming is recommended.—*L. R. Waldron.*

4770. ADINARAYANA RAO, K. **Bacteria and the farmer.** Jour. Madras Agric. Students Union 10: 120-123. 1922.—This summarizes a paper read before the Agricultural Students Association and notices the part played by bacteria in agriculture, plant and human diseases, and the industries.—*P. S. Jivanna Rao.*

4771. ARTHUR, B. M., W. D. KERLE, MARK H. REYNOLDS, AND H. BARTLETT. **Crop-growing competitions, 1923.** Some of the judges' reports. Agric. Gaz. New South Wales 35: 31-44. 1924.—Detailed results are given for 4 crop-growing contests with wheat grown for both grain and hay, and oats grown for grain. It was found that there is ample room for marked improvement of type and purity of seed upon many of the farms.—*L. R. Waldron.*

4772. ATKINSON, ESMOND. **The bracken ferns of New Zealand.** New Zealand Jour. Agric. 26: 1-10. 6 fig. 1923.—*Pteridium esculentum* (Forst. f.) Cockayne, *Paesia scaberula* (A. Rich.) Kuhn, and *Histiopteris incisa* (Thunb.) J. Sm. are common and are ranked as weeds because able to establish and maintain themselves on grassland. The species are described and figured, and their distribution is discussed.—*N. J. Giddings.*

4773. BEAUVERIE, J. **Sur les circonstances qui peuvent modifier l'effet de la "période critique" sur le rendement du blé.** [Conditions which modify the effect of the critical period upon the yield of wheat.] Compt. Rend. Acad. Sci. Paris 177: 1060-1061. 1923.—A comparison is made of conditions in 1923 with those reported for 20 years prior. The conditions of the weather for this year were in certain respects extreme. The development of *Puccinia glumarum* was extraordinarily intense and of long duration.—*C. H. Farr.*

4774. BRAND, CHARLES J. The status of the movement to establish universal standards for American cotton. Internat. Rev. Sci. and Practice of Agric. 1: 573-586. 6 fig. 1923.—The scope of the work to establish an equitable standard for American cotton in home and foreign markets is reported. The photographs of samples of grades are for use in determining commercial cotton values when actual samples are not at hand.—James E. Chapman.

4775. CAPINPIN, JOSÉ M. Correlation within pure lines of rice. Philippine Agric. 12: 3-14. 1923.—Among plants of a pure strain, culm length was not correlated with high yielding power. Number of bearing culms and weight of straw were decidedly associated with yield. Length of panicle, number of nodes per panicle, and number of spikes per panicle were slightly associated with yield.—Sam F. Trelease.

4776. CHRISTENSEN, HAROLD. Undersøgelser over Forholdet mellem Udviklingen af Humle-Sneglegaelg af Jordens Reaktionsstilstand. [Relation between growth of yellow trefoil and soil reaction.] Tidsskr. Planteavl 1924: 265-296. 1924.—The development of *Medicago lupulina* varies considerably where sown with oats or barley, a common practice in Denmark for green manuring purposes. It fails in spots, this being generally ascribed to the need of lime; the trefoil was thus used as a lime-need indicator crop. To test this relationship about 400 soil tests were made. It was found that the failure of yellow trefoil is not a reliable guide to the need of lime, and should be supplemented with soil tests before lime is applied.—Albert A. Hansen.

4777. CLARKE, WARREN T. Turkish tobacco culture, curing and marketing. California Agric. Exp. Sta. Bull. 366. 639-616. 1923. The cultural operations involved in growing Turkish tobacco are discussed. Varieties and methods of improvement through selection, and the problems of fermentation, grading, and marketing are considered fully.—A. R. C. Haas.

4778. CLAYTON, E. S., R. N. MAKIN, AND E. B. FURBY. Farmers' experiment plots. Winter green fodder experiments, 1923. Agric. Gaz. New South Wales 35: 86-94. 2 fig. 1924.—Trials were conducted with wheat, oats, rye, and barley in 3 districts, 2 near the coast and 1 at Murrumbidgee under irrigation. Wheat grown with vetches or with peas generally yielded more than wheat alone. Using 200 pounds superphosphate per acre produced increased net returns over unmanured plots. Yields under irrigation were comparatively low.—L. R. Waldron.

4779. COELHO DE SOUZA, WILLIAM WILSON. Possibilidades da cultura algodoeira no Brazil. [The possibilities of cotton culture in Brazil.] 33 p. Imprensa Nacional: Rio de Janeiro, 1922.

4780. DAVEY, H. W. Weeds and their eradication. Jour. Dept. Agric. Victoria 21: 27-31. Figs. 51-52. 1923.—Hoary cress (*Lepidium draba* L.) and hedge mustard (*Sisymbrium orientale* L.) are discussed.—Wm. E. Lawrence.

4781. DOMIN, K. Kritické poznámky o bramboru (*Solanum tuberosum* L.). [Critical remarks concerning potatoes, especially origin and biology and morphology of the flower.] Casové Spisky Ministerstva Zemědělství 1923³⁰: 3-49. 1923.—The author reviews critically recent pertinent literature.—K. Kočnar.

4782. EARLE, F. S. An annotated list of sugar-cane varieties. Jour. Porto Rico Dept. Agric. 4³: 3-80. 1920.—The most general method of controlling various sugar cane epidemics is by the substitution of varieties better adapted to existing conditions and better able to contend with prevailing pests and diseases. This practice necessitates as complete information as obtainable concerning sugar cane varieties. From his studies on this subject the author presents an alphabetical list of the sugar cane varieties of the world, including 1,695 names.—Geo. H. Dungan.

4783. FISKE, JESSIE G. Report of the Department of Seed Analysis. New Jersey Agric. Exp. Sta. Ann. Rept. 42: 167-172. 1920/21 [1922].—During the year, 1338 unofficial samples of seed were tested. A number of samples of legume inoculants were tested, practically all of which contained a relatively large number of viable organisms.—Wm. H. Martin.

4784. FROBERVILLE, L. F. DE. Arrowed and normal cane. South African Sugar Jour. 7: 888. 1923.—Sugar cane (near Darnall, Natal) which had arrowed (flowered) and cane growing in the same field which had not arrowed are compared. The analyses were made immediately

after cutting (Nov. 2), and included weight and length of individual canes, average length of internodes, brix (total solids) and sucrose in juice, glucose quotient, purity (clerget), per cent of sucrose and fiber. Internodes of non-arrowed canes averaged about 30% shorter; otherwise no significant differences were noted.—*C. Rumbold*.

4785. GEORGESEON, C. C. Report of the agronomist in charge. Ann. Rept. Alaska Agric. Exp. Sta. 1922: 1-25. Pl. 1, 2, figs. 1-7. 1923.—This gives a general review of the work carried on at the 5 experiment stations in Alaska, including weather, variety testing, plant breeding, and other work.—*J. P. Anderson*.

4786. HAMILTON, CLARK. Regulations under the Seeds Act 1923. Agric. Gaz. Canada 11: 23-25. 1924.—The author outlines the scope of regulations made by the Minister of Agriculture to control the sale of agricultural and garden seeds. It embodies recommendations of seed-growers for the primary purpose of defining seed grades for domestic use and export as well as import. It gives the general basis of rulings without going into detail.—*James E. Chapman*.

4787. HANSEN, FRODE. Undersølgelser over Prøveudtagning af Afgrøder. [Methods of crop sampling.] Tidsskr. Planteavl 1924: 219-261. 1924.—The investigations were made to ascertain errors in collecting samples for chemical analyses of crops in field experiments. An attempt is made to compute the amount of error (1) in procuring samples for determining dry matter and nitrogen content of an oat crop; (2) in procuring samples for botanical analyses, hay percentage, dry matter and nitrogen of grass crops; and (3) in the determination of the relationship between the content in straw and awns. The results are being used as a basis for collection and treatment of samples of crops used in the state experiments.—*Albert A. Hansen*.

4788. HARRISON, L. S. Wheat experiment plots in the drier areas. Agric. Gaz. New South Wales 35: 83-85. 4 fig. 1924.—Yields up to 23 bushels per acre were secured on the edge of the 13½-inch rainfall belt, considered at present outside of the wheat area proper. Methods of cultivation are given.—*L. R. Waldron*.

4789. HENSEL, R. L. Effect of burning on vegetation in Kansas pastures. Jour. Agric. Res. 23: 631-644. 2 pl., 4 fig. 1923.—Studies for 4 years on the common practice of burning pastures in the spring substantiated the popular opinion that burning causes growth to start earlier in the spring. The total growth for the season was in favor of the unburned areas but the difference was slight and not consistent. Burning did not decrease the total number of grass plants as might be expected but did change the predominating type somewhat. Thus burning decreased the number of specimens of big bluestem (*Andropogon furcatus*) and of Kentucky bluegrass (*Poa pratensis*) but increased the little bluestem (*Andropogon scoparius*). The number of weeds was also decreased by burning. The earlier growth in the spring was thought to be due to higher temperatures of the burned areas, the differences at a depth of 1 inch being 12.1°F. for the average maximum temperature and 4.1°F. for the average minimum temperature. While recognizing the fact that experiments of longer duration must be conducted before definite conclusions are stated, it is pointed out that the experiments have failed to show that burning is injurious while certain advantages as stated above have been noted. No constant significant differences in yield were noted.—*S. C. Salmon*.

4790. HERTEL, H. Landbruget i 1923. [Agriculture during 1923.] Tidsskr. Landøkonomi 1924: 1-38. 1924.—A résumé is given of agricultural conditions, exports, etc., in Denmark during 1923.—*Albert A. Hansen*.

4791. HOLDEN, J. A. Crop rotation under irrigation. Nebraska Agric. Exp. Sta. Bull. 190. 11 p. 1923.—This bulletin reports the effects of manuring and crop rotation upon the yields of potatoes, sugar beets, corn, oats, and wheat grown under irrigation in Scottsbluff County, Nebraska. As an average for 6 years, manure increased the sugar beet yield 7.9 tons per acre, while the increase was 7 tons following alfalfa. Potato yields on unmanured land, manured land, and following alfalfa were 113.7, 183.8, and 289.3 bushels per acre respectively. The average yield of corn was 32.2 bushels on unmanured land and 60 when grown on alfalfa land. Oats averaged 46.1 bushels on unmanured land, 62.2 on manured land, and 66.6 on alfalfa land. Wheat yielded 20 bushels on unmanured land and 28 on alfalfa land. Flax was a complete failure throughout the 6-year period.—*T. A. Kiesselbach*.

4792. HUBBARD, W. HUSTACE. *Cotton and the cotton market.* 8vo, xii + 503 p. D. Appleton & Co.: London, 1923.

4793. HUTCHESON, T. B., AND D. J. BERGER. *Experiments with bright tobacco and other crops grown on bright tobacco farms.* Virginia Agric. Exp. Sta. Bull. 233. 19 p. 1923.—Fertilizer experiments and variety tests on tobacco, grain, and forage crops at Chatham, Virginia, are reported. A complete fertilizer should be used on bright tobacco and quantities in excess of those commonly used by farmers are found to be economical. As much as 1,400 pounds per acre of a 3-8-3 fertilizer was profitable on thin soils. Lime should not be applied on tobacco land as it reduces both quality and yield; it is important, however, for the production of grain and forage crops. The rotation advised for tobacco land should not include legumes or lime, whereas for grain and forage it should include legumes as often as practicable and lime at least once in 6 years.—*F. D. Fromme.*

4794. HUTCHESON, T. B., AND T. K. WOLFE. *The production of field crops.* xv + 499 p., 145 fig. McGraw-Hill Book Co., Inc.: New York, 1924.—This book is designed to meet the needs of a standard course in field crops, following "as closely as practicable" the outline for a standard introductory course in field crops recently adopted by the American Society of Agronomy. The titles of the chapters are as follows: beginnings of plant culture, classification of field crops, economics of crop production, germination and growth, adaptation of crops, plant improvement, value of good varieties, value of good seed, how to secure good seeds, preparation of the seedbed, commercial fertilizers, barnyard manure, lime, seeding practices, tillage, harvesting and storage of grain crops, harvesting forage crops, hay making, silage, special-purpose crops, plant association and competition, pasture management, meadow management, weeds, crop rotation, crop insects and diseases, grain grading, cereals, corn, wheat, oats, barley, rye, buckwheat, sorghums, cotton, tobacco, potatoes, sweet potato, peanuts, some cultivated grasses, clovers, alfalfa, soybeans and miscellaneous crops. There is a bibliography of 14 pages.—*C. S. Gager.*

4795. JIVANNA RAO, P. S. *Prickly pear as a failure.* Jour. Madras Agric. Students Union 10: 346-348. 1922.—*Opuntia Dillenii* does not thrive under conditions of heavy precipitation or of excessive moisture in the soil. Many fruits abort; the author suggests this may be due to the partial sterility of the pollen and ovules resulting from vegetative propagation and the extreme sensitiveness of the former to moisture. The pollen grains are 90-130 μ in diameter, full of starch, and burst readily in distilled water.—*Author.*

4796. LAUR, E. *Internationale Landbouworganisatie en haar toekomst.* [International agricultural organization and its future.] Landbouwk. Tijdschr. 1: 1-12. 1924.

4797. LÜTZEN, M. WINTHER. *Lidt om Landbruget paa Faerøerne.* [Brief description of the agriculture of the Faroe Islands.] Tidsskr. Landøkonomi 1924: 39-52. 1924.—The Faroe Islands are hilly and probably of volcanic origin; agriculture is backward and not very productive. The Danish government is attempting to introduce more modern methods and to encourage agricultural development.—*Albert A. Hansen.*

4798. MARTIN, WILLIAM H. *Studies in the relation of maturity to vigor in seed potatoes.* Ann. Rept. New Jersey Agric. Exp. Sta. 42: 456-460. 1920/21 [1922].—Seed potatoes were dug at weekly intervals, beginning 2 weeks after blossoming and continuing until the plants had matured. The various lots of seed were planted on the same day the following spring. Vine measurements showed a fairly uniform decrease in average height with increased maturity of the seed piece. Likewise, with each increase in maturity there was a decrease in yield, an increase of 74.4 bushels per acre being recorded for the immature over the mature seed.—*Author.*

4799. MARTIN, WILLIAM H. *The fertilizer value of sulfur for potatoes.* Ann. Rept. New Jersey Agric. Exp. Sta. 42: 435-455. 1920/21 [1922].—Experiments conducted in the greenhouse showed that fertilizer at the rate of 1,800 pounds per acre, to which was added 100 pounds of sulphur, gave an average yield increase of 3.4 bushels per acre. With 300 and 500 pounds of sulphur the yields decreased 18.7 and 72.3 bushels per acre, respectively. Broadcasting sulphur at the rate of 200 and 400 pounds before planting resulted in no injury; but with 600 pounds the yield was slightly reduced.—*Author.*

4800. MERKEL UND U. STAFFELD. *Deutsche Landwirtschaftliche Gesellschaft Sortenversuchsergebnisse mit Sommergetreide u. Feldbohnen 1922, sowie Gesamtübersicht 1920/22.* [Tests of varieties of summer grain and field beans.] *Mitteil. Deutsch. Landw. Ges.* 39: 49-58. 1924.—The authors report on tests at 8 stations in different parts of Germany with (1) 3 varieties of oats for heavy or medium soils and 4 varieties for light soils; (2) 5 varieties of summer wheat and 3 of field beans.—*A. J. Pieters.*

4801. MILLER, M. F., AND F. L. DULEY. *Soil experiments on the brown silt loam of the border Ozark region.* *Missouri Agric. Exp. Sta. Bull.* 203. 3-24, fig. 1-7. 1923.—In cooperative fertilizer experiments with corn, cowpeas, wheat, and clover, on the Union silt loam of the Ozarks border region since 1912, phosphate fertilizers, ground limestone, and barnyard manure were found profitable. Rock phosphate was not as profitable as a source of phosphorus as bonemeal on this experiment field. Discussion of soil management under the conditions of this experiment field is appended.—*L. J. Stadler.*

4802. MOLLGAARD, HOLGER. *Om Naeringsvaerdi og Foderenhedsberegning.* [Food value and quality of fodder.] *Tidsskr. Landøkonomi* 1923: 505-546. 1923.—The author considers the quality of various fodders and the correct quantities to be fed to keep domestic animals, particularly dairy cows, in a healthy condition.—*Albert A. Hansen.*

4803. MUSGRAVE, GEORGE W. *Report of the Department of Agronomy and Agricultural Economics.* *New Jersey Agric. Exp. Sta. Ann. Rept.* 42: 263-285. 1 pl., 2 fig. 1920/21 [1922].—Results of experiments with potatoes to determine the most economical size of seed piece indicated that an increase in yield could be expected up to and including a 1½ ounce piece. In a potato variety test, the varieties included yielded as follows: Irish Cobbler 205.4, Green Mountain 168.2, American Giant 137.9, Rural 108.7 bushels per acre.—*Wm. H. Martin.*

4804. NEIDIG, RAY E., AND ROBERT S. SNYDER. *Sunflower investigations.* *Jour. Agric. Res.* 24: 769-780. 1923.—The composition of the sunflower plant was studied when harvested at various stages during growth, and when spaced (1) 4-8 and (2) 36 inches apart in the row. The plants grown under the 2 spacings were compared for percentage of leaves, stalks, stems and flowers, and analyses were made of composite samples of these plant parts. The composition of the sunflowers grown under the various conditions was determined; also, the silage made from the sunflowers cut at different stages of maturity.—Results for the 1920-1921 crops indicate that crude fiber does not increase materially until almost maturity. All 5 stages analyzed showed a similar crude fiber content; complete maturity is scarcely ever reached in the Palouse country due to early frosts. It is suggested that some of the unfavorable feeding results noted in the literature may be due to harvesting when too mature, resulting in a silage containing considerable amounts of hard woody material not palatable to stock.—Crude protein is highest in the leaves and lowest in the stalks; flowers contain an intermediate amount. No material differences were noted in the percentage of leaves and stalks in the different spacings. Little difference in composition or yield was noted in the different systems of planting. The choice of spacings will rest with the farmer, depending chiefly on whether it is more economical to harvest small or large type sunflowers. All stages of maturity and all systems of planting resulted in a good, normal quality of silage as judged by the acid fermentations, odor, and appearance.—*R. E. Neidig.*

4805. PIPER, CHARLES V. *Bulbous bluegrass.* *Torreyia* 24: 7-8. 1924.—*Poa bulbosa* L. has been established for many years on the lawns of Capitol Square, Richmond, Virginia, and has been reported also from Arlington Farm and Ashland, Virginia, Middletown, Connecticut, and Bingen and Walla Walla, Washington. The underground stem is a true bulb. The bulblets are imported in alfalfa seed from Turkestan and France and in red-clover seed from Italy.—*J. C. Nelson.*

4806. PITT, J. M. *Maize trials.* *Central North Coast, season 1922-23.* *Agric. Gaz. New South Wales* 35: 105-109. 1 fig. 1924.—Maize varieties were grown by 11 men and spacing trials were carried out by 5 men. The maximum yield reported was 115 bushels from the variety Wellingrove. Generally, wider spacings gave the higher yields.—*L. R. Waldron.*

4807. ROUPPERT, H. *Aperçu agricole sur la région de Fez.* [Agricultural sketch of the region of Fez.] 154 p., illus. F. Paillart: Abbeville, France. 1921.—The area lies between the regions of Meknes and Taza. Besides cereals and cattle, the olive is one of the principal

resources. Grapes succeed well. The principal fruit trees grown are fig, apricot, peach, quince, pomegranate, plum, and cherry. Silk culture has flourished.—*G. M. Weston.*

4808. SCHARNAGEL. *Zur Technik der Stammes und Sortenprüfung in Zuchtwirtschaften und Versuchsstationen.* [Technique of strain and variety testing.] *Mitteil. Deutsch. Landw. Ges.* 39: 58-61. 1924.—Plot size and yields from outer and inner rows in grains are discussed.—*A. J. Pieters.*

4809. SHEPHERD, A. N., AND B. M. ARTHUR. *Crop-growing competitions, 1923. Some further judges' reports.* *Agric. Gaz. New South Wales* 35: 95-103. 1924.—Details of awards are tabulated indicating characters used in judging in addition to other data, such as varieties used, presence of disease, and weather conditions. Bunt, loose smut, and flag smut were more or less in evidence, in some cases quite severely.—*L. R. Waldron.*

4810. SMITH, H. A. *Wheat-growing in New South Wales.* *Agric. Gaz. New South Wales* 35: 1-10. 1 map. 1924.—The 1922 western and eastern wheat-growing limits and the limit of the 10-inch seasonal rain-fall are delineated upon a map and the geography of the 2 limits is discussed in detail. The main factors affecting profitable wheat-growing in N. S. W. are class of soil, rainfall and evaporation, science, transport, and price and yield. It is estimated that 12-15 million acres are at present capable of profitable wheat production. Wheat has been produced recently only upon about 7,500,000 acres. In certain instances wheat has been produced profitably with seasonal rainfalls as low as 9 and even 8 inches. The average yield per acre for the past 10 years was 11.6 bushels.—*L. R. Waldron.*

4811. SNELL, KARL. *Keimungsprüfungen bei der Kartoffelknolle.* [Germination tests with potato tubers.] *Mitteil. Deutsch. Landw. Ges.* 38: 211-214. 1924.—From several series of tests, reported in tabular form, the author concludes that there is a positive correlation between thickness of sprouts and yields.—*A. J. Pieters.*

4812. SPILLMAN, W. J. *Farm management.* 459 p., 45 fig. The Orange Judd Publishing Co.: New York, 1924.—This book considers in separate chapters the following phases of the problem: the problem of capital in farming, extent of the farm enterprises, distribution of types of farming, status of cereal crop enterprises, status of hay and forage and cotton, status of some of the minor crops, status of fruit and truck crops, distribution of livestock enterprises, dairying, beef cattle enterprises, economics of sheep husbandry, hogs as a farm enterprise, farm organization, the physical organization or the farm layout, business organization of the farm, farm organization in New England, farm organization in a corn belt locality, business organization of farms in the cotton belt, seasonal distribution of labor, tenancy, law of diminishing returns and marketing. The chapters have reference lists appended.—*Mary R. Burr.*

4813. STAFFELD, U. *Saattabellen für Sommer- und Wintergetreide.* [Seed tables for summer and winter grain.] *Mitteil. Deutsch. Landw. Ges.* 38: 146-149. 1924.—Various tables show the number of germinable seeds for heavy, medium and light soils, the number of plants, and the distance between plants per unit area when rye, wheat, barley, and oats are seeded at given rates per $\frac{1}{4}$ hectare.—*A. J. Pieters.*

4814. STOA, T. E. *Better flaxseed production.* *North Dakota Agric. Exp. Sta. Circ.* 23. 8 p., 8 fig. 1924.—The resistance of any presumed resistant lot of seed will be determined at the experiment station for the farmer by growing in diseased soil. Data on flaxseed production and importations are given for the U. S. A. for 6 years.—*L. R. Waldron.*

4815. SWAMI RAO, R. *The spacing of crops.* *Jour. Madras Agric. Students Union* 10: 220-225. 1922.—Differences in the sowing and spacing of cotton and sorghum, as adopted in 2 adjacent districts of the Madras Presidency differing only with regard to rainfall, are pointed out with a statement of the results obtained in the case of cotton in 3 different places.—*P. S. Jivanna Rao.*

4816. TURPIN, EDNA HENRY LEE. *Cotton.* vi + 266 p. American Book Co.: New York, 1924.

4817. UTRA, GUSTAVO R. P. D'. *O fumo, sua cultura e preparacao.* [The cultivation and preparation of tobacco.] vii + 137 p. Secretaria da Agricultura, Commercio e Obras Publicas do Estado: São Paulo, Brazil, 1921.

4818. WALLACE, T. The effects of muriate of potash and sulphate on the cooking and keeping qualities of potatoes. Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta. 1921: 136-144. 1921.—Increased amounts of potassium in the fertilizer applied did not increase the yield, but seemed to increase the resistance of tubers to water loss from the surface. There is an opinion that high potassium content of fertilizer, particularly a high content of potassium chloride, is injurious to the flavor of potatoes produced. The results suggest that there is no such influence.—W. H. Chandler.

4819. WATKINS, W. R. Treatment of cotton seed with superphosphate paste. Agric. Gaz. New South Wales 35: 10. 1924.—Treating cotton seed with superphosphate paste to eliminate the seed fuzz in order to facilitate planting, has an injurious effect upon germination and its use is not recommended.—L. R. Waldron.

4820. WHITTET, J. N. Control of imported seeds and plants. Agric. Gaz. New South Wales 35: 110-114. 1924.—Methods of inspection are given for both seeds and plants. Detailed results are given of weed seeds per pound found in samples of *Trifolium repens*, *Linum usitatissimum*, *Danthonia pilosa*, and *Holcus lanatus*. Star grass (*Cynodon plectostachyum*) has been held in quarantine pending investigations as to the possible injurious effects of the comparatively large quantities of hydrocyanic acid found in the plant.—L. R. Waldron.

4821. ZOOK, L. L. Dry farming investigations at the Scottsbluff Substation. Nebraska Agric. Exp. Sta. Bull. 192. 23 p. 1923.—Results from dry-land crop rotation and cultural experiments are reported for the period 1911 to 1921 inclusive. Corn was found to be the most productive dry land crop, yielding 1,159 pounds of dry shelled corn per acre compared with 786 pounds for winter wheat, which was the highest yielding small grain crop. Sorghum was the most successful forage crop. No consistent advantage resulted from either spring or fall plowing. Yields of spring wheat and oats were consistently and materially higher on corn land than after a small grain crop. Double discing proved as effective preparation of corn ground for small grain as either spring or fall plowing. A corn and small grain rotation was more profitable than a fallow and small grain rotation. Moisture proved more important than fertility in determining crop yields under these dry land conditions.—T. A. Kiesselbach.

4822. ZOOK, L. L., AND W. W. BURR. Sixteen years' production at the North Platte Substation. Nebraska Agric. Exp. Sta. Bull. 193. 52 p. 1923.—The authors have brought up to date various crop investigations conducted at the substation for 16 years. They conclude that the following practices are advantageous: use of locally adapted seed corn; listing; early fall plowing of stubble for corn rather than spring plowing; plowing at a medium depth rather than deep or shallow; early compact seed bed preparation for winter wheat; seeding winter wheat on corn stalk land; use of early maturing rather than late varieties of oats; and relatively early seeding of all small grain crops. Planting corn on corn land was more profitable than on summer tilled land. Spring wheat yielded only 61% as much as winter wheat.—T. A. Kiesselbach.

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

C. W. DODGE, *Editor*

CHARLES A. WEATHERBY, *Assistant Editor*

(See also in this issue Entries 4896, 4957, 4993, 5089, 5317, 5319, 5322, 5329, 5340, 5482, 5503, 5593, 5598)

4823. ANONYMOUS. The "History of Science Society." Science 59: 138. 1924.—The purpose of this proposed organization is to encourage the study of the subject and to assure permanent and adequate support for the international publication *Isis*.—M. G. Phillips.

4824. ÅHLANDER, FR. E. Förteckning över svensk botanisk litteratur under åren 1914 och 1915 (jämte äldre tillägg). [List of Swedish botanical literature during 1914 and 1915 (with additions to previous years).] Svensk Bot. Tidskr. 17: 331-368. 1923.

4825. CHAMBERLAIN, EDWARD B. William Henry Pearson. *Bryologist* 27: 12-14. *Pl. 4 (portrait)*. 1924.—William H. Pearson (1849-1923) of Manchester, England, was a yarn agent by occupation. His botanical interests were directed towards hepatics by Dr. Carrington and Richard Spruce, his studies being mainly confined to the species of the British Isles and of certain of the British colonies. At the time of his death he was undoubtedly the foremost British student of hepatics.—*Author*.

4826. CHRISTENSEN, CARL. Joachim Frederik Schouw 1 Anledning of Hundredaaret for Udgivelsen of hans Plantegioграфи. [Joachim Frederik Schouw, on the occasion of the hundredth anniversary of the publication of his plant geography.] *Bot. Tidsskr.* 38: 1-56. *Portrait*. 1923.—Christensen gives a rather condensed biography of Schouw (1789-1852). Schouw's Plant Geography, for which he is famous, appeared in 1823. In addition to his scientific achievements, Schouw was one of the outstanding men of his period and occupied very prominent positions politically. His plant geography studies were a result of extensive travel and study throughout Europe, especially Italy. His contemplated work upon the Italian flora was never completed. In the biographical sketch submitted by Christensen, there is included an autobiography written in 1844.—*A. L. Bakke*.

4827. DECKSBACH, N. Die Biologische Murman-Station. *Internat. Rev. Ges. Hydrobiol. u. Hydrograph.* 11: 222. 1923.—An account is given of the biological station at Alezandrowsk (Russia).—*N. Carter*.

4828. DEICHMÜLLER, JOH. Hermann Engelhardt. *Leopoldina* 55⁷⁻⁸: 1-6. 1919.—This is an account of the life and work of this Saxon paleobotanist, 1839-1918, with an important list of his voluminous contributions to systematic paleobotany.—*E. W. Berry*.

4829. HARRIS, J. ARTHUR. The E. W. D. Holway herbarium and library. *Science* 59: 139-140. 1924.—The late E. W. D. Holway left his library and collections of Uredineae to the University of Minnesota, which has undertaken to complete a monograph on them. The volumes and sheets may soon be consulted by interested specialists.—*C. J. Lyon*.

4830. JACKSON, BENJAMIN DAYDON. Linnaeus. 8 vo, xv + 416 p., 12 illus. H. F. & G. Witherby: London, 1923.—This is the story of the life of Linnaeus (afterwards Carl von Linné), adopted from the Swedish of THEODOR MAGNUS FRIES, and brought down to the present time in the light of recent research. The illustrations include lithograph portraits, and other plates and maps. It is written "to make known to English readers the monumental 'Life of Carl von Linné' by the late Professor T. M. Fries (1832-1913), by far the most detailed and accurate account of the great Swedish naturalist ever published." Most of the illustrations in Fries's book have been omitted, "though portraits of Linné, views of his houses, etc., could not well be passed over. Professor Fries's method of using the birth-name 'Linnaeus' during the early half of his life, adopting the Swedish form 'Linné' from the time of his settling as professor in Uppsala, has been followed. In a letter to P. Wargentin, dated Feb. 10, 1764, Linné says, "'Linnaeus' or Linné are the same to me; one is Latin, the other Swedish."—The book contains a glossary of Swedish titles, a short history of Sweden during the lifetime of Linnaeus, a select bibliography, and an index. The 16 chapters are followed by 7 appendices as follows: Linné's autobiographies; genealogical tables; Linné's pupils; extracts from his "Nemesis Divina"; list of Swedish titles, money and distances; sketch of Swedish history during Linné's lifetime; bibliography.—*C. S. Gager*.

4831. LITYNSKI, A. Die hydrobiologische Station am Wigry- See. [The biological station at Wigry.] *Internat. Rev. Ges. Hydrobiol. u. Hydrograph.* 11: 566-567. 1923.

4832. LITYNSKI, A. La Station Hydrobiologique de Wigry (Suwalki, Pologne). *Ann. Biol. Lacustre* 10: 224-225. 1921.—An account is given of a new biological station in Poland.—*N. Carter*.

4833. MAGROU, J[OSEPH]. Pasteur et la pathologie végétale. [Pasteur and plant pathology.] *Congrès Path. Vég. Strasbourg. P. 13*. Imprimerie Alsacienne: Strasbourg, 1923.—Though Pasteur never engaged in problems of vegetable pathology as such, nevertheless it is especially to his influence that phytopathology owes its marvelous growth since the middle of the 19th century. He was not content to apply particular results in a limited field of observation, but introduced into science a new viewpoint capable of orienting the mind anew and solving the most obscure problems even beyond his own domain of study. Thanks to Pasteur and his school, the parasitic origin of most of the diseases of animals and plants has been successfully demonstrated.—*Frederick V. Rand*.

4834. **MONTEMARTINI, LUIGI. Rodolfo Farneti.** Atti Ist. Bot. Univ. Pavia 18: iii-viii. *Portrait.* 1921.—Farneti (1859-1919) was born in Chiesina, Province of Bologna. On account of his studies on the flora of his native mountains and other parts of Italy he was appointed in 1886 curator of the collections of the Botanical Institute and Cryptogamic Laboratory at Pavia. His work has always been noted for its honesty and scrupulousness of observation and experimentation. In Pavia he worked on the Mosses, the Hepaticae, and the Flora of the region; but chiefly in the fields of Mycology and Pathology. As a pathologist he believed the action of parasites as most important, and as a mycologist he recognized the polymorphism of fungi, being able to unite not only imperfect with ascigerous forms, but also imperfect forms between themselves, demonstrating that the same species may produce different imperfect forms. He worked on the polymorphism and growth of *Botrytis hormini*; and on the rice blast, establishing the parasitic nature of the disease, and demonstrating that *Pyricularia*, *Helminthosporium*, and *Cladosporium*, found on rice, are all forms of the same fungus. He correlated *Fusarium* and *Giberella* and proved that they cause the withering of mulberry shoots. He demonstrated that the cause of the ink disease of chestnut should be looked for in the aerial parts of the plant, and proved the pathogenicity of *Coryneum perniciosum*. A list of 56 publications is appended.—*P. D. Caldis.*

4835. **POLIMANTI, OSWALDO. Une nouvelle station hydrobiologique en Italie.** Ann. Biol. Lacustre 11: 89. 1922.—A new biological station at Trasimeno, Italy, is announced.—*N. Carter.*

4836. [R. E.] **Joseph Virieux.** Ann. Biol. Lacustre 9: 281-282. 1918.—Virieux was born in 1890 and was killed in 1915 in the Great War. He was a brilliant young scientist, who, although only living to the age of 25 years, had already made many contributions to science.—*N. Carter.*

4837. **RICHEL, C. Note nécrologique sur Gaston Bonnier.** Compt. Rend. Soc. Biol. 88: 2-3. 1923.—The principal works of the former professor of botany at the Sorbonne are briefly recalled.—*Oran Raber.*

4838. **ROBINSON, B. L. Mary A. Day.** Science 59: 205-206. 1924.—Miss Day, librarian of the Gray Herbarium at Harvard University for 31 years, died Jan. 27, 1924.—*C. J. Lyon.*

4839. **S., E. In Memoriam. Thomas Gibbs.** Naturalist 1919: 177-180. *Portrait.* 1919.—Thirty-nine papers are listed dealing with mycology, meteorology, entomology, plant distribution, etc.—*W. H. Burrell.*

4840. **SMITH, ANNIE MORRILL. Edith A. Warner.** Bryologist 27: 11. 1924.—Edith A. Warner (1856-1923) was for many years a school teacher. In 1897 she became interested in the study of mosses, and with others helped to organize the Sullivant Moss Society.—*E. B. Chamberlain.*

4841. **STEELE, T. The plants of the Bible.** Australian Nat. 5: 133-155. 1924.—The scientific names, often the Biblical reference, and a paragraph about the relations to man in Biblical times, are given.—*T. C. Frye.*

4842. **SUBRAMANYAM, P. R. Agriculture in the time of the Mauryas.** Jour. Madras Agric. Students Union 10: 6-9, 47-52, 83-86. 1922.—This article is based on an English translation of the ancient Sanskrit work "Arthashastra" by Kautilya and draws attention to the organization of an agricultural department in India in the earlier days. Brief references are included under the following heads: knowledge and practice of agriculture, tillage operations and implements, manures, sowing of seeds, irrigation, some agricultural pests, preservation of seeds, laws relating to agricultural offences and marketing of agricultural produce, conditions of labour and agricultural classes in general, and state aid to agriculture.—*P. S. Jivanna Rao.*

4843. **WOLTERECK. Die Station am Lago Trasimeno.** [The biological station on Lake Trasimeno, Italy.] Internat. Rev. Ges. Hydrobiol. u. Hydrograph. 11: 565. 1923.

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*ARTHUR H. GRAVES, *Assistant Editor*

(See also in this issue Entries 4794, 4812, 4830, 5002, 5005, 5478, 5485)

4844. BENEDICT, R. C. The conservation of beauty. Brooklyn Bot. Gard. Leaflets 12²: 1-4. 1924.—This paper, prepared especially for schools, advocates the conservation of native American flowers, and urges support of the measure looking thereto, now before the New York State Legislature.—A. H. Graves.

4845. BRUNS, FERDINAND. Die Zeichenkunst im Dienst der beschreibenden Naturwissenschaften. [The art of illustrating for the descriptive natural sciences.] viii + 100 p., 6 fig.—This book contains instructions for the various methods of illustrating as applied to the natural sciences, and includes such subjects as perspective, the silhouette, black and white work, light and shadow, the making of wall charts, and drawing from sections and microscopical preparations in general.—A. H. Graves.

4846. COULTER, JOHN M., AND MERLE C. COULTER. Where evolution and religion meet. v + 105 p. The Macmillan Co.: New York, 1924.

4847. HOUARD, C., ET M. LORTET. Rapport annuel pour 1919 sur l'Institut Botanique et les collections botaniques de Caen. [1919 report on the Botanical Institute and collections at Caen.] Bull. Soc. Linn. Normandie VII, 2: 248-258. 1919.

4848. METCALF, Z. P. A conventional scheme for teaching cell division (mitosis). Science 59: 165-166. 1924.—This includes a reproduction and detailed explanation of a chart used successfully in embryology classes. The cyclic nature of mitosis is emphasized. The process is considered as taking place in 5 stages. The term mesophase is introduced to cover the time of formation of the spireme.—C. J. Lyon.

4849. MOLISCH, HANS. Populäre biologische Vorträge. [Popular lectures on biology.] vii + 306 p., 71 fig. Gustav Fischer: Jena, 1922.

4850. RIGG, GEORGE B. Science and liberal education. School and Soc. 17: 477-485. 1923.—This article points out the necessity of a larger place for science in a liberal education. The more extensive election of science courses can be secured only by reforming them in recognition of the difference between students desiring liberal education and those in training for a career in science.—W. L. Eikenberry.

4851. SALT, HENRY S. The call of the wildflower. 192 p. Allen and Unwin: London, 1922.

4852. SHAW, ELLEN EDDY. Eleventh annual garden exhibit for Brooklyn boys and girls. Brooklyn Bot. Gard. Leaflets 12¹: 1-4. 1924.—This announces the conditions of entry and prizes offered in the annual exhibit to be held at the Brooklyn Botanic Garden, of vegetables and flowers grown by Brooklyn boys and girls.—A. H. Graves.

4853. THOMSON, J. ARTHUR. The new natural history. 19 p. Oxford Univ. Press: London, 1923.—A lecture delivered at Oxford University in 1923 is printed.—A. H. Graves.

4854. TORREY, RAYMOND H., FRANK PLACE, JR., AND ROBERT L. DICKINSON. New York walk book. xvi + 215 p., 80 fig., 9 map. Amer. Geog. Soc.: New York, 1923.—As stated on the title page, this book contains "suggestions for excursions afoot within a radius of 50-100 miles of the city and including Westchester County, the Highlands of the Hudson and the Ramapo, northern and central New Jersey and the New Jersey Pine Barrens, Long Island, the Shawangunk Range, the Catskills, and the Taconics." The text is arranged somewhat on the plan of Baedeker's guides, the chief points of interest in each trip being located and described. Short chapters are appended on various subjects of interest to the tramp, among which are fire laws and regulations, geology and physical geography of the region in question, plant life of the region, and a list of maps and guide books.—A. H. Graves.

CYTOLOGY

GILBERT M. SMITH, *Editor*

(See also in this issue Entries 4848, 5008, 5027, 5044, 5108, 5130, 5132, 5133, 5215, 5297, 5360, 5384, 5463, 5466)

4855. NASSANOV, D. N. Das Golgische Binnennetz und seine Beziehungen zu der Sekretion. Untersuchungen über einige Amphibiendrüsen. [The Golgi net and its relation to secretion. Investigations on some amphibian glands.] Arch. Mikrosk. Anat. 97: 136-180. Pl. 10-12. 1923.—Investigations were carried out on the pelvic glands, pancreas, and intestinal slime glands of *Triton laevis*. Secretory activity has been credited to the nucleus, the "nebenkern," the ergastoplasm, and finally the chondriosomes. Pelvic glands and pancreas develop serous secretion whereas the slime glands develop slime. The earliest distinguishable stage in the slime cells consists in minute mucin-droplets whereas in the other 2 a preceding granule stage is present, the granules being finally transformed into the definitive product. In all cases the particles first appear arranged in chains on the meshes of the Golgi net, from which, after reaching a certain size, they are freed thus initiating the 1st step in the secretion mechanism. These granules either fill up the cells or collect in a definite zone. In no case does the net fragment, but parts from the net may form an osmophilic girdle about the free particles (pelvic glands) or be attached to them.—The mechanism for emptying the cell is independent of the net. In slime cells, chondriosome granules may be due to the reagents but in the pancreas and pelvic glands they seem to originate from swellings on the chondriocents and may represent transition forms from chondriosomes to secretion. The constant appearance of particles on the net meshes does not seem accidental. Two suppositions are possible: either the net changes chemically and directly produces either the slime drops or granules, with no relation to the chondriosomes; or the net is an intermediary between the product and some other source of material. The granules may be such a source, in which case it must be assumed that they approach the net and, from the influence of this contact, change to the secretion product. Perhaps the undifferentiated protoplasm develops ultramicroscopic particles, as a result of direct contact with the net meshes. This view approaches the conceptions of Heidenhain; however, the appearance of the particles on the net meshes agrees with the views of those who adhere to the mitochondrial secretion theory.—H. C. Sands.

4856. OKUNEFF, N. Studien über Zellveränderungen im Hungerzustande. (Das Chondriom.) [Studies of cell changes as a result of starvation, with especial reference to the chondriosomes.] Arch. Mikrosk. Anat. 97: 181-201. 1923.—Five rabbits were allowed to starve for 9, 11, 15, and 17 days respectively. The urine was examined for albumen and acetone, these compounds being considered a measure of the degree of hunger injury. In all cases parts of the kidneys, liver, pancreas, testicle, and spleen were examined and compared with the normal. The greatest changes were found in the liver and kidney cells. The tissue of a starved animal could be differentiated from that of a nourished one, all cells of the former being greatly reduced in size. The chondriosome division is directly proportional to the degree of starvation injury. In somewhat advanced injury, the chondriosomes lie evenly distributed throughout the cell body, without, however, the hyaline separation areas found in the normal. Atrophy may also occur and some nuclei may show indication of degeneration. The chondriosomes enlarge progressively with the degree of starvation and finally change to regular, round, drop-like structures. Such drops simulate the drop-like bodies found in pathological conditions. In these cells no normal chondriosomes are found. In extreme injury these structures, directly traceable from normal chondriosomes, lose their staining properties and resemble vacuoles, the protoplasm in consequence sometimes acquiring a foam-like appearance. In the kidney tissue, restricted to somewhat definite structures, exactly similar changes are to be noted. Very slight changes occur in the pancreas and testicles. However, in the pancreas a reduction in the quantity of secretion granules is noticeable. These changes can be grouped under the head of "drop-separation," or the "cloudy swelling" of the older authors. A rather complete bibliography is presented.—H. C. Sands.

4857. WEIDENREICH, FRANZ. Über Differenzierung und Entdifferenzierung. [Differentiation and de-differentiation.] Arch. Mikrosk. Anat. 97: 225-248. 1923.—The ontogenic development of the cell consists not only in growth and division, but also in histological development. The morphological development is not easily determined since the criteria of nondifferentiated cells are difficult to determine on other than morphological grounds because undifferentiated cells do not exist in nature. The egg is as differentiated as the body cell; the sperm perhaps more so. An assertion to the contrary can be made only on the basis that they show no especial structure. Non-differentiation can be postulated only upon the absence of appearances recognized as differentiated. A highly differentiated cell may have less unchanged protoplasm than an undifferentiated one. A process which includes all parts may be designated as holoplasmatic differentiation. Here, no final unchanged protoplasm is to be found—the highest degree of differentiation has been reached. In meroplasmatic differentiation only a part of the cell is involved. Weidenreich finds that all differentiation products, measured by the living condition, are death phenomena. In holoplasmatic differentiation the cell dies after it has completed its normal function and therefore must be replaced from new elements. In meroplasmatic differentiation it is not known that the differentiation of product is a death process and that the product is replaced by the undifferentiated protoplasm directly or indirectly. In regeneration, one finds a multiplication of fibrils by amitotic division which corresponds to the ontogenic development of the fibers from the myoblasts. This means that all tissue has latent within it the capacity for regeneration. In meroplasmatic differentiation, the capacity to divide is proportionately lost with progressive differentiation, and while this permits the cell to free itself from differentiation products, such differentiation causes proportionately advancing torpidity with final death. Continuous division hinders differentiation and postpones death; both together regulate the organism. Where nuclei have already differentiated in the holoplasmatic process, further differentiation of the cell does not occur whereas in the meroplasmatic process, where cells have been freed from their differentiation products, further activities may follow. Each change of differentiation presupposes a de-differentiation by which is understood a refusion of already differentiated parts with new creations.—H. C. Sands.

ECOLOGY AND PLANT GEOGRAPHY

GEO. D. FULLER, *Editor*

(See also in this issue Entries 4826, 4939, 4940, 4943, 4946, 4953, 4954, 4957, 4965, 4966, 4987, 4999, 5001, 5046, 5058, 5062, 5108, 5109, 5120, 5131, 5142, 5143, 5144, 5147, 5190, 5258, 5333, 5372, 5373, 5381, 5458, 5476, 5481, 5488, 5544, 5558, 5593, 5605)

GENERAL, FACTORS, MEASUREMENTS

4858. ANDERSON, KNUD HEE, OG HILMAR ØDUM. En Salt-Flora i Slagmose ved Rislev. [A saline flora in a peat bog at Rislev.] Bot. Tidsskr. 38: 57-68. 1923.—This bog is not extensive but may conveniently be divided into 3 parts depending upon the habitat: (1) the bordering surface vegetation, (2) the areas where the peat has been removed in later years, (3) the moist areas. Numerous plants are present which are not usually found in bogs. Many are exceedingly abundant and are typical of salt waters, such as *Enteromorpha intestinalis*, *Triglochin maritima*, *Juncus Gerardi*, *Scirpus maritimus*, *S. Tabernaemontani*, *Spergularia salina*, *Chenopodium rubrum*, *Atriplex patulum*, *A. hastatum*, *Trifolium fragiferum*, *Glaux maritima*, *Plantago maritima*. These plants are restricted to a particular area of the bog. *Chenopodium rubrum*, *Atriplex patulum*, *Trifolium fragiferum*, and *Plantago maritima* may be met with elsewhere. Borings show a deposit of salt. The author suggests an explanation of origin but adds that at present a definite statement concerning the origin of the deposit is not possible.—A. L. Bakke.

4859. BONACINA, L. C. W. Polar climate and vegetation. Nature 112: 436-437. 1923.—Stefansson thinks that if the Antarctic Plateau were lowered to sea level, the ice sheet would disappear, allowing grass or perhaps spruce to flourish as in the arctic lowlands. High sum-

mer temperatures would not be so likely in the Antarctic, however, on account of the moisture carried by the winds from the sea. The importance for plant growth of the large amount of diffuse sunlight is discussed. [Further comment by V. STEFANSSON, *Nature* 112: 472-473.]—O. A. Stevens.

4860. CHEMIN, E. *Le genre Lathraea in Basse Normandie*. [Lathraea in lower Normandy.] *Bull. Soc. Linn. Normandie* VII, 2: 75-84. 1919.—This is based on citations of old authors on the occurrence of 2 species of *Lathraea* in lower Normandy. *L. clandestina* behaves as a calcifuge whereas *L. squamaria* is apparently a calcicole.—M. Denis.

4861. COWLES, R. P., AND A. M. SCHWITALLA. *The hydrogen-ion concentration of a creek, its waterfall, swamp and ponds*. *Ecology* 4: 402-416. 3 fig. 1923.—In the creek studied, situated in part on the campus of Johns Hopkins University, the free CO₂ content seemed to be a determining factor in establishing and maintaining pH values.—Herbert C. Hanson.

4862. CRIBBS, JAMES E. *Ecology of Tilia Americana II. Comparative studies of foliar transpiring power*. *Bot. Gaz.* 71: 289-313. 10 fig. 1921.—Using the cobalt chloride paper method the transpiring power of this tree was studied on a variety of clay-soil habitats. The rates are related to the conditions of the habitat, the transpiring power being least in deep forests and increasing with open woodlands, open stands on clay and open stands on sand. The daily curves for different associations are compared, the xerophytic ones giving greatest variation. The records are plotted in a series of graphs along with temperature, evaporation, and relative humidity.—Geo. D. Fuller.

4863. DACHNOWSKI, A. P. *Peat deposits and their evidence of climatic changes*. *Bot. Gaz.* 72: 57-87. 12 fig. 1921.—Several peat deposits in Ohio are examined and an attempt is made to read from them evidence of past climatic change. The data are characterized as inadequate but indicating in a tentative manner that since the disappearance of the Wisconsin ice sheet 2 comparatively cool and dry periods have alternated with a relatively warm and humid period. The present period is thought to be approaching a climate of rising temperatures and decreasing precipitation.—Geo. D. Fuller.

4864. DU RIETZ, G. EINAR. *Statistisk vegetationsanalys*. [Statistical vegetation analysis.] *Svensk Bot. Tidskr.* 17: 154-164. 1923.—The work is a reply to a critical study on certain parts of the author's *Pflanzensoziologie* (1921), published by Svedberg (*Svensk Bot. Tidskr.* 16: 1922). The mathematical formula of Svedberg, founded on the laws of probability, may be useful in the study of the distribution of the species within a small homogenous portion of an association; it does not, however, hold good for the distribution of the constants of a whole association, as the distribution of the constants is rather irregular in the different parts of the association. Svedberg seems to have misinterpreted the constant concept of the Upsala school. The determination of the constants is a qualitative process, the mere existence or non-existence of a species as a constant component of an association being stated without specifying quantities in which it occurs. The author analyses in detail his material for determining the constants and states that it does not agree with Svedberg's formula, nor do the calculations, published by Svedberg in a recent work by Nordhagen (*Nyt Mag. Naturvidensk.* 61: 1922), agree with conditions found in nature.—O. Heilborn.

4865. FOREST, H. DE. *Rainfall interception by plants: an experimental note*. *Ecology* 4: 417-419. 1923.—From results obtained by the author through experiments on imitation reeds, made of pliable tin, with natural and artificial rainfall and from results obtained by Marloth on Table Mountain, Cape Colony, South Africa, the conclusion is reached that it is still doubtful whether interception losses occur in certain types of crop plants. The additional statement is made that interception gains instead of losses may be customary in certain kinds of vegetation.—Herbert C. Hanson.

4866. FULLER, GEO. D. *Plants of acid soils*. *Bot. Gaz.* 71: 244-245. 1921.—This review of several papers by E. T. Wherry dealing with the application of H-ion field studies characterizes these methods as likely to place the old contention of the relative importance of the physical and the chemical properties of soil upon a new and experimental basis. It may also result in a clearer conception of the meaning and application of such terms as silicoles and calcicoles.—Author.

4867. FULLER, GEO. D. **Geography of plants.** [Rev. of: HARDY, M. E. *The geography of plants.* xii + 327 p., 115 fig. Clarendon Press: Oxford 1920.] Bot. Gaz. 71: 402. 1921.—The general plan of the volume is approved but it is criticized on account of the inaccuracy of such details as placing the genus *Cedrus* in North America.—*Geo. D. Fuller.*

4868. FURRER, ERNEST. **Kleine Pflanzengeographie der Schweiz.** [A brief plant geography of Switzerland.] 323 p., 46 fig. Beer & Co.: Zurich, 1923.—The author aims at providing a text-book on plant geography of interest to teachers, pupils, and "friends of nature." The book is divided into 5 parts. The 1st deals with the geology of the Alps, the Molasse, and the Jura; with the climate; and with the factors and conditions of silviculture. In the 2nd Furrer enumerates 5 methods of studying vegetation—the physiognomic, floristic, local (including genetic and successional), temporary or transitional, and ecological—and explains that he employs the first 2, as is customary in Switzerland. The "vegetational types" include descriptions of forests—deciduous and coniferous—scrub, turf, pastures, moors and fell-fields. Another section is devoted to various successional series such as those of the moor, peat-bog, and dune. The last part contains an interesting account of the history of the Swiss flora from the Tertiary through the glacial and xerothermic periods down to the present. Furrer's list of fossil plants of Switzerland harmonizes with that in Berry's work on the trees of America.—*A. Norrington.*

4869. HELLAND-HANSEN, BJORN. **The ocean waters: an introduction to physical oceanography.** Internat. Rev. Ges. Hydrobiol. u. Hydrograph. 11: 393-487. 1923.—Methods are given for determining the density, specific gravity, osmotic pressure, alkalinity, and H-ion concentration and gas content of sea-water.—*N. Carter.*

4870. HERVEY, A. B. **Columnar holes.** Science 59: 238. 1924.—This is a brief note of confirmation of the observation of Harshberger [see Bot. Absts. 13, Entry 756] that certain holes in sand dunes are made by the decomposition of inclosed tree trunks. The writer has observed them in the rocks around the shores of Bermuda and in one found the top of the stump of a juniper tree.—*C. J. Lyon.*

4871. KINCER, JOSEPH B. **The climate of the great plains as a factor in their utilization.** Ann. Assoc. Amer. Geogr. 13: 67-80. 6 fig. 1923.—An analysis is made of the moisture and temperature of the great plains of the U. S. A. in their relations to natural vegetation and to crop production.—*Geo. D. Fuller.*

4872. KLUGH, A. B. **A common system of classification in plant and animal ecology.** Ecology 4: 366-377. 1923.—The author outlines the methods of classification and the terminology now in use showing a general lack of agreement especially among plant and animal ecologists. A common scheme is much needed. Succession although important is regarded as a less satisfactory basis of classification than habitat, including vegetation. On this basis a system of ecological classification is outlined applicable to both plants and animals. The term "systasis" is proposed for communities that are not sufficiently distinctive to rank as associations, and the term "cenosis" as a substitute for the indefinite "society." The rapid development of ecology suggests that it is wiser to use vernacular names for the present although precise technical terms of classic origin will ultimately prevail and such terms are suggested.—*T. J. Fitzpatrick.*

4873. KORSTIAN, C. F. **Ecological relations of roots of crop plants.** [Rev. of: WEAVER, J. E., F. C. JEAN AND J. W. CRIST. *Development and activities of roots of crop plants: a study in crop ecology.* Carnegie Inst. Washington Publ. 316. 117 p. 1922 (see Bot. Absts. 11, Entry 4694).] Ecology 5: 104-106. 1924.

4874. MARBUT, C. F. **Soils of the great plains [U. S. A.].** Ann. Assoc. Amer. Geogr. 13: 41-66. 2 pl., 2 fig. 1923.—The stages are outlined in the development of soils from a youthful condition where the character is determined by that of the parent geological material to a maturity where the character is largely independent of the parent rock and determined by factors of climate and vegetation. Profiles of the soils of the grassland region are given and a soil map is elaborated showing 3 main soil belts passing from north to south. From east to west they are the black, the dark brown, and the brown belt and they coincide closely with vegetational belts.—*Geo. D. Fuller.*

4875. MOE, ASCHE. Blomstringstid og veirlig 1920-22. [Flowering time and weather 1920-22.] *Naturen* 1923: 233-240. 4 fig. 1923.—An account is presented of the relations between flowering time of vernal plants and the weather in southwestern Norway. Exact phenological and meteorological data are given for 3 years.—*K. Münster Strøm.*

4876. NOVAK, FRANT A. Vápencové obvody v Malých Karpatech a jejich význam ve fytogeografické jednotě Malých Karpat. [The limestone districts in the Little Carpathian Mountains: Their significance in the phytogeographic uniformity of this range.] *Preslia* [Rept. Czechoslovak Bot. Soc. Prague] 2: 67-80. 1922 [1923].—The northern and southwestern parts of these mountains are of limestone separated by non-calcareous rocks in the central portion. Many plants found only the in southern part are very thermophile and the dealpine and prealpine elements are wanting whereas among those confined to the northern limestone district are many dealpine and prealpine species. The thermophile vegetation seems diminishing in the north. Thus there seems to be little affinity between the 2 calcareous districts, the northern region being more independent. Lists of species are given and 1 new species, *Hieracium Nemeci*; 1 new variety, *Stellaria media* var. *glutinosa*; and 3 new forms, *Stipa pennata* var. *Tirsa* f. *glaucescens*, *Anemone nigricans* f. *violacea*, and *Anemone devinensis* are described. [With summary in English.]—*Geo. D. Fuller.*

4877. SCHARFETTER, RUDOLF. Phenology and agriculture. *Internat. Rev. Sci. and Practice Agric.* 1: 561-571. 1 fig. 1923.—After defining phenology (Gans) the works of Hoffman, Solms-Laubach, Klebs, Drude and Raunkiaer are referred to. The attempt to correlate the annual cycle of plants with isothermal lines and thus discover the limits of types of vegetation has not been entirely satisfactory. The writer contributes a correlation of rhythm in climatic phenomena, vegetation and plant formation to aid in the determination of limits of plant habitats.—The climate of central Europe is contrasted with that of the Mediterranean zone. Six charts show the periodic climatic changes; the annual cycle of several plants and their relative adaptation to these 2 types of climate is pointed out. From this comparison he concludes "When the course of Vegetationsrhythmik" runs parallel to "Klimarhythmik" the plant can be classed as indigenous to that particular region. Plants in native and foreign habitats are discussed, such as *Colchicum autumnale*, *Leucojum vernum*, *Zea Mays*, *Solanum tuberosum*, *Nicotiana tabacum*, *Robinia pseudacacia*, *Centaurea cyanus*, *Avena sativa*, and others. A systematic study of plants with reference to periodic changes in climate and plant growth will guide the work of plant introductions.—*James E. Chapman.*

4878. SHELFORD, VICTOR E. The determination of hydrogen ion concentration in connection with fresh water biological studies. *Bull. Illinois Nat. Hist. Surv.* 14: 381-395. 1923.—The article is largely devoted to a study of the influence of H-ion concentration on the breeding of fish in Illinois streams.—*H. W. Anderson.*

4879. WHERRY, EDGAR T. A soil acidity map of a Long Island wild garden. *Ecology* 4: 395-401. 1 fig. 1923.—An area of 100 acres has been mapped, the soil acidity being shown by lines resembling contours. The "acidity contours" do not exactly coincide with the topographic ones. The highest specific acidities, 300+, were found on the ridges; the lowest, 3+, in the valley bottoms. The acidity decreased more rapidly on descending the south slopes than on the north. Three lists of characteristic plants are given; 10 species of the mediacid summits, 10 of the mimimacid soils, and 10 indifferent plants. The ridge soils showed a decrease of acidity with depth to 10 at 90 cm. The data are being put to practical use in deciding on the best locations and methods of treatment for introduced plants.—*Herbert C. Hanson.*

STRUCTURE, BEHAVIOR, SYMBIOSIS

4880. CHEMIN, E. Organisation florale et pollinisation chez les *Lathraea*. [Floral organization and pollination of *Lathraea*.] *Bull. Soc. Linn. Normandie* 3: 125-145. 1920.—Drones visit the flowers of *L. clandestina* and assure their pollination.—*M. Denis.*

4881. COTTE, J., ET A. REYNIER. La dioecie du Figuier et *Blastophaga psenes* L. [The dioecism of the fig tree and *Blastophaga psenes*.] *Compt. Rend. Soc. Biol.* 88: 500-502. 1923.—The various steps in the development of dioecism in *Ficus carica* are traced; also the relation of these steps to the *Blastophaga*. The evolutionary steps in the fig have been (1) per-

fect flowers, (2) monoecism, (3) dioecism in the same generation, and (4) dioecism in different generations. The Blastophaga has played a part in this last step, the dioecism having existed before the establishment of parasitism by the insect.—*Oran Raber*.

4882. EMERSON, FRED W. Subterranean organs of bog plants. Bot. Gaz. 72: 359-374. 11 fig. 1921.—The subterranean organs of plants on floating mats were found to be superficial, nearly all living tissue being above the level of the water. Water level, not acidity nor toxins, seems the cause of this shallowness. There were no apparent marked differences in the underground organs of a given species growing in a bog and in comparable conditions in mineral soils.—Three types of behavior were noted, resulting in the superficial placing of the living parts of the bog plants: (1) the parts assume the horizontal position above the water level; (2) the tap-root is ephemeral and is replaced by horizontal laterals; (3) the roots are all vertical and die at the water surface.—*Geo. D. Fuller*.

4883. FULLER, GEO. D. Root systems. Bot. Gaz. 69: 351-354. 1920.—Many contributions are summarized, including the work of Weaver, Markle, and Cannon. Attention is directed to the fact that several types of root systems are now recognized and that the few physiological investigations on roots have pointed to wide diversity in the responses of individual species to changes in their environment.—*Geo. D. Fuller*.

4884. IHERING, HERMANN VON. Der periodische Blattwechsel der Bäume im tropischen und subtropischen Südamerika. [The periodic leaf-fall in tropical and subtropical South America.] Bot. Jahrb. 58: 524-598. 1923.—The winter conditions are by no means so extreme in Brazil as in central Europe, yet there is a distinct seasonal fall of leaf in many trees. The author finds that since no local conditions can seem to account for this the cause must be sought in the history of the flora. Neither the neotropical, North American, nor antarctic elements can account for it. The phenomenon is apparently a feature of the Asiatic element solely, and is to be interpreted as having been acquired by this element as an adaptation to periods of dryness, not cold, to which this southern Asiatic element was subjected before it migrated to America in the Tertiary. The habit has been retained though no longer necessary in Brazil. The paper contains comprehensive accounts of climatic conditions in Brazil and of phenological, meteorological, and leaf-fall observations in other tropical countries.—*K. M. Wiegand*.

4885. JOHNSON, DUNCAN S. Polypodium vulgare as an epiphyte. Bot. Gaz. 72: 237-244. 3 fig. 1921.—This fern is recorded as occurring freely at a height of 20 feet above the ground on *Quercus prinus* in Maryland. There is evidence that the plants developed in this situation from prothallia. The fern seems to be a facultative epiphyte, endemic to the temperate zone, not one imported with this habit already formed in the tropics.—*Geo. D. Fuller*.

4886. JOHNSON, DUNCAN S. The influence of insolation on the distribution and on the developmental sequence of the flowers of the giant cactus of Arizona. Ecology 5: 70-82. 4 fig. 1924.—Blooming crowns of *Carnegiea* (*Cereus*) observed near Tucson show flowers on the east side developing and opening many days before those on the west side of the stem. The tissues of the east side of the stem, warmed by the morning sun, have during the hours of daylight a temperature averaging 2°C. above that of the rest of the plant. This higher temperature seems nearer the optimum for growth, thus accounting for the earlier maturing of the flowers. The west side of the plant warms up more slowly, reaching its maximum in the afternoon.—*T. J. Fitzpatrick*.

4887. McWHORTER, FRANK P. Destruction of mosses by lichens. Bot. Gaz. 72: 321-325. 1 pl. 1921.—*Cladonia* and *Amphiloma* are shown to occur parasitically on such mosses as *Dicranum* and *Grimmia*. Such a development of lichens in moss colonies makes possible the coming of a lichen stage after the moss associations.—*Geo. D. Fuller*.

4888. MELLOR, E., ET A. DAVY DE VIRVILLE. La détérioration des vitraux d'église de la Mayenne par les lichens. [The destructive action of lichens on the church windows of Mayenne.] Bull. Mayenne Sci. 1921: 53-67. 2 pl. 1921.—Many Mayenne church windows, dating to the 15th, 16th, and 17th centuries, show deterioration, due to the etching of the glass by water charged with CO₂ and to the mechanical action of vitricole lichens which are able to incorporate in their thalli the debris of the disintegrated glass. The lichens affecting windows in Mayenne are: *Diploicia canescens*, *Rinodia exigua*, *Lecanora subfusca*. High

atmospheric humidity favors the development of the lichens on glass, and in Mayenne and probably also in all the Breton region the windows with north and west exposure are most damaged.—*M. Denis.*

4889. WATERMAN, W. G. Note on juvenile leaves in *Thuja occidentalis*. Trans. Illinois Acad. Sci. 14: 85-86. 2 fig. 1921.—W. J. G. Land has produced juvenile (needle) or adult (scale) leaves by varying the moisture condition of the air surrounding the young plants. A 3-year-old plant of *Thuja occidentalis*, which had been dried until about half the branches had died, produced juvenile leaves when revived by supplying water to the roots.—*W. G. McGinnies.*

4890. WEAVER, J. E., JOSEPH KRAMER, AND MAUD REED. Development of root and shoot of winter wheat under field environment. Ecology 5: 26-50. 5 fig. 1924.—Kanred winter wheat was grown at Lincoln, Nebraska, under field conditions during 1921 and 1922. Growth rate as indicated by dry weight of tops, photosynthetic area, number of leaves and tillers, number, length, and absorbing area of roots was determined at 10-day intervals during the fall and at longer intervals during winter and spring. Favorable environmental conditions promoted rapid development. Tiller production started 15 days after planting and a new tiller was added every 4-5 days until December, when an average of 15 tillers and 43 leaves per plant was attained. The photosynthetic area increased to 226 square cm. by the middle of November and closely paralleled the increase in dry weight, which reached the maximum (0.882 gm.) by Dec. 14. Growth progressed rapidly in late November, at average daily temperatures of 34°F. The roots consisted of a primary system of 3 roots which penetrated rather vertically downward, at the rate of over $\frac{1}{2}$ inch a day, and, branching widely, reached depths of 3-4 feet by the middle of December. Development of the secondary root system was correlated with that of tiller production, a new root being added every 4-5 days until the middle of November, after which the chief growth was not in number but in elongation and branching. By December the secondary root system consisted of 11 roots, some of which reached downward 22 inches. They constituted $\frac{1}{2}$ the total absorbing area, which was 310 square cm., and 38% of the total root length, which was 32.4 m. Root growth ceased simultaneously with that of above-ground parts. During the 90 days of dormancy the dry weight of tops, due to leaf deterioration, decreased 44%. Progressive deterioration of the older leaves occurred, but leaves that escaped injury early in the winter deteriorated little, 20% remaining undamaged. The roots were apparently uninjured, although the soil was frozen at times to a depth of 12 inches. Leaf growth took place slowly in February at an average daily temperature of 35°F. During the last half of March both roots and shoots resumed growth, and in less than 2 weeks at an average temperature of 42°F. the crop regained 60% of the loss in dry weight which had occurred during the winter.—*Herbert C. Hanson.*

VEGETATION

4891. COOPER, W. S. The recent ecological history of Glacier Bay, Alaska: III. Permanent quadrats at Glacier Bay: an initial report upon a long-period study. Ecology 4: 355-365. 7 fig. 1923.—Nine permanent quadrats were established in 3 localities on the shores of Glacier Bay, Alaska, in 1916, at points where the time since the retreat of the ice is definitely known. They were recharted in 1921. There was a small increase in total number of individuals. A very high mortality was more than counterbalanced by new arrivals, indicating a rapid change of population. Gain in area covered was proportionately much greater. The major part of the advance in the establishment of the vegetation cover was due to the activities of few individuals, among the many that germinated, which survived and persisted. The most important of these were *Dryas* and species of *Salix*, all mat-formers and therefore effective in covering the ground.—*J. E. Weaver.*

4892. DE FOREST, H. The plant ecology of the Rock River woodlands of Ogle County, Illinois. Trans. Illinois Acad. Sci. 14: 152-193. 1 map. 1921.—The area dealt with comprises 75-80 square miles along Rock River. The soil away from the river is a brown to black loam contrasting with rapidly eroding clays near the streams. The region lies within the forest-prairie transition region. The trees were formerly more widely distributed than now.

The writer recognises several associations showing progression toward and retrogression from the mesophytic climax forest. The movement in a xerophytic direction is due to the activities of man and not to any climatical change, as progression is taking place where man has not interfered.—*W. G. McGinnies*.

4893. HUMPHREY, H. B. The phytogeography of the Coeur D'Alène flood plain of northern Idaho. *Ecology* 5: 6-13. 4 fig. 1924.—In addition to a phytogeographic sketch, lists of species of plants concerned in the reclamation of ponds, lakes, etc., are given.—*J. E. Weaver*.

4894. JOHNSON, DUNCAN S. Invasion of virgin soil in the tropics. *Bot. Gaz.* 72: 305-312. 2 fig. 1921.—Virgin soil surfaces made by floods and landslides in Jamaica were visited 9 years after their origin and hardly more than $\frac{1}{10}$ of the surface was hidden by plant foliage. A list of the plants is given and they are seen to be chiefly perennials, many of them half shrubby ones. The distribution of plants seems related to the physical character of the soil, being more abundant where the finer particles have accumulated. Aside from this the causes for this slowness in revegetation has not been determined.—*Geo D. Fuller*.

4895. PERRIER DE LA BÂTHIE, H. Sur les tourbières et autres dépôts de matières végétales de Madagascar. [Peat bogs and other deposits of vegetable matter in Madagascar.] *Bull. Soc. Linn. Normandie* 4: 141-161. 1921 [1922].—Contrary to the accepted view there are peat bogs in tropical countries. In Madagascar there may be distinguished: (1) true peat bogs with peat produced in situ, including (a) *Sphagnum* bogs found in the eastern and central regions particularly at Tampoketsa and Andringitra where typical sphagnum bogs are found located here and there in narrow marshy depressions and which are being invaded by shrubs and trees, and (b) fern and sedge moors scattered almost everywhere, except in the south, and comprising bogs of *Cyperus* (Lake Alaotra); bogs of *Nephrodium thelypteris*, *Cyperus nudicaulis*, *Emilia adscendens*, *Leersia hexandra*, *Lycreus Mundtii*, *Helichrysum aphaelioides*, etc.; and bogs of *Lycreus solidifolius*, *Nephrodium thelypteris*, *Dryopteris gongyloides glabra*, *Lycreus simulans*, and *Cyperus platycaulis*. (2) Allochthonous bogs and alluvial deposits, including (a) deposits from floating bogs where ferns and sedges which surround lakes and pools break up into fine particles which sink to the bottom and form a muddy peat. Near dunes this is transformed into a grey organic cement where the wind-blown sand sinks to the bottom of the water; (b) estuary deposits on the western shore, invaded by mangroves, alternately washed by salt and fresh water which serves to precipitate floating detritus and this mixed with debris from the mangroves forms carbonaceous slime which changes to the true lignite; and (c) marine deposits where debris brought down by rivers and not caught in the estuaries is carried out to sea and thrown upon the shores. The resulting soil because of lack of nitrification is sterile. The peat is used for fuel only in the central region.—*M. Denis*.

4896. REAGAN, ALBERT B. Some plants of the Bois Fort Indian Reservation and vicinity in Minnesota. *Trans. Illinois Acad. Sci.* 14: 61-70. 1921.—One-half the area, located 140 miles north of Duluth, Minnesota, and 38 miles south of Fort Francis, Ontario, is muskeg; the rest varies from sand to clay soil. The region is largely in a virgin state with a covering of pine and hardwood trees. A list of 120 plants identified by the author, with notes on their use by the Indians, makes up the bulk of the paper. The Indian's methods in harvesting wild rice and in sugar making are treated rather fully.—*W. G. McGinnies*.

4897. REGEL, CONSTANTIN. Assoziationen und Assoziationskomplexe der Kola Lappmark. [Associations and association-complexes of Kola Lappmark.] *Bot. Jahrb.* 58: 607-635. 1923.—The plants of this portion of Russian Lapland are here classified ecologically in much detail. A comprehensive description of the flora is followed by a table setting forth the associations and sub-associations occurring in the region. Following a discussion of what constitutes association complexes, such complexes are classified in the form of a table as they occur in Kola Lappmark.—*K. M. Wiegand*.

4898. SHANTZ, H. L. The natural vegetation of the great plains region [U. S. A.]. *Ann. Assoc. Amer. Geogr.* 13: 81-107. Pl. 3-8, 2 fig. 1923.—The vegetation of the plains region is carefully considered in relation to such factors as rainfall and soil conditions. The chief types of grassland distinguished, described, and mapped are: short grass, tall grass, mesquite and desert grass, savanna, sagebrush, and mesquite grass. These types are subdivided on the detailed map and are illustrated by photographs.—*Geo. D. Fuller*.

4899. SIMPSON, C. T. *In Lower Florida wilds.* xv + 404 p., 64 pl., 2 map. G. P. Putnam's Sons: New York, 1920.—Two chapters of this book should be of particular interest to ecologists since one outlines the plant succession from the pine lands to the "hammocks," and the other gives a picture of the primeval forest of the semi-tropical type. The author believes that the "hammock" is the true climax vegetation of the region and his emphasis on the destructive and retrogressive action of fire furnishes a part of the explanation why this climax is not more widely spread.—*Geo. D. Fuller.*

4900. WATERMAN, W. G. *Preliminary report on the bogs of northern Illinois.* Trans. Illinois Acad. Sci. 14: 79-84. *Fig. 1-6.* 1921.—Seven bogs in Lake County were studied, 4 being described in detail. These show typical bog vegetation and are the only bogs known to Illinois. The presence of large peat areas in Lake County indicates that larger bog areas formerly existed.—*H. W. Anderson.*

FLORISTICS

4901. BUGNON, P. *Contributions à la connaissance de la flore de Normandie: observations faites en 1920.* [Observations on the flora of Normandy.] Bull. Soc. Linn. Normandie 3: 315-324. 1920.—The acclimatization of *Spartina Townsendi* and the extension of its range at the mouth of the Orne is recorded.—*M. Denis.*

4902. ENGLER, A. *Zustimmende Bemerkungen zu Herrn Elmer D. Merrells Abhandlung über die pflanzengeographische Scheidung von Formosa und den Philippinen.* [Observations supporting E. D. Merrill's contribution on the phytogeographical distinctness of Formosa and the Philippines.] Bot. Jahrb. 58: 605-606. 1923.—The author gives assent to Merrill's statement [Bot. Absts. 13, Entry 4907] that Formosa is more closely related to the mainland in its flora than to the Philippines. He gives evidence to show that this is especially true of the flora of the highlands in Formosa. If there is any portion of Formosa belonging to the monsoon-belt flora it is the coastal region. Engler is inclined to exclude this coastal region from the east Asiatic subtropical transition region to which the rest of Formosa belongs.—*K. M. Wiegand.*

4903. GLEASON, H. A. *The vegetational history of the middle west.* Ann. Assoc. Amer. Geogr. 12: 39-85. 1923.—After a general discussion of the nature and evidence of plant migration the author concludes that the principal elements of the flora of the middle west of the U. S. A. were differentiated during the Tertiary and each glacial advance has induced migrations towards the south and west, but deciduous forests have lived uninterruptedly in the Ohio valley. Readjustments took place during interglacial stages, and during the Sangamon much of the middle west was occupied by deciduous forests. During the Wisconsin glaciation a semi-arid climate dominated the middle west, restricting the advance of boreal floras, and this was succeeded by a xerothermic period following the retreat of the ice causing the eastward migration of the prairies as far as Ohio. Then a gradual increase in rainfall caused a westward migration of deciduous forests composed of 2 elements from Ohio and from the Alleghany Mountains. The arrival of the Indian and forest fires caused another retreat eastward of forests, but during the 19th century afforestation continued until checked by cultivation.—*Geo. D. Fuller.*

4904. JOHANSSON, K. *Växtgeografiska spörsmål rörande den svenska Hieracium-floran.* [Problems concerning the plant geography of the Swedish Hieracium-flora.] Svensk Bot. Tidskr. 17: 175-214. *Fig. 1-12.* 1923.—The paper deals principally with the Hieracia silvaticiformia, only lowland species being treated. Most of these species are found only within limited areas. Thus, of the 260 species investigated, 202 have been found in 1-5 of the Swedish provinces, while only 58 show a wider distribution, occurring in 6-24 provinces. All the Swedish silvaticiformia show continuous areas of distribution occurring in Sweden. The more widespread of them are found in Norway, and Finland, too, but are rare in southwest Sweden. They have probably migrated from the south at the end of the glacial period, when the southwest was below sea-level. Species with very limited distribution belong essentially to the middle and north of the country and have probably arisen within their present borders. They must be younger than the wides. Hieracia have probably been spread largely by animals and by man. The silvaticiformia avoid sand and clay but are favored by

a small per cent of lime in the ground. Most of the Swedish silvaticiformia have apparently their southern climatic limit in southern Sweden. The problem of species-formation in *Hieracium* is discussed and lines for future investigations on the Swedish *Hieracia* are suggested.—O. Heilborn.

4905. LETACQ, A. Note sur la flore de Crocheniêlier et de Cône-Bergère près Bellême (Orne). [Note on the flora of Crocheniêlier and Cône-Bergère near Bellême.] Bull. Soc. Linn. Normandie 4: 214-218. 1921 [1922].

4906. LUDWIG, OSKAR. Das pontische und aquilonare Element in der Flora Schlesiens. [The pontic and aquilonic element in the flora of Silesia.] Bot. Jahrb. 58, Beiblatt 130: 11-38. 1 map. 1923.—The use of the terms pontic and aquilonic is discussed at length. The former relates to the geographic region about the Black Sea and the latter to a region which embraces both this and the whole Mediterranean region. Plants representing these elements in Silesia are listed as to occurrence in different soils and exposures. The most species occur in middle Silesia and are more commonly in open places and at low altitudes; few are found in deep woods. The path of invasion is discussed, also the geological period at which the invasion took place. The occurrence of these elements elsewhere in the vicinity is mentioned.—K. M. Wiegand.

4907. MERRILL, ELMER D. Die pflanzengeographische Scheidung von Formosa und den Philippinen. [The phytogeographical distinctness of Formosa and the Philippines.] Bot. Jahrb. 58: 599-604. 1923.—Evidence is produced to show that the flora of the Island of Formosa is more closely related to that of the mainland of Asia, particularly to Indo-China, than to the Philippine Archipelago. This relation is shown to be not unnatural, as a deep strait separates Formosa from the northernmost islands of the Philippines, while Formosa is really on the continental shelf. Historically there was probably a land bridge to the mainland, and from the Philippines to the Malay Peninsula, but none from Formosa to the Philippines. [See also Bot. Absts. 13, Entry 4902.]—K. M. Wiegand.

4908. PALMGREN, ALVAR. Die Entfernung als pflanzengeographischer Faktor. [Distance as a factor in plant geography.] Acta Soc. Fauna et Flora Fennica 49: 1-113. 1 pl. 1921.—A rather detailed account of floristic and genetic plant geography of the Åland archipelago is given. The species count of the 14 districts (parishes) into which this region is divided is recorded. The region falls naturally into 4 zones from the point of view of plant geography. Qualitatively, the plants of the region are remarkably alike; quantitatively, the species count decreases gradually from west to east. Within a zone the species number decreases gradually from the southeast to the northwest. The plant distribution of the region is caused by the vegetation having migrated from the Swedish mainland eastward. Those islands farthest east are relatively poorest because the members of the early migrations succeeded in obtaining and maintaining a complete foothold to the exclusion of later incoming plants. Environmental factors, according to Palmgren, are too constant to account for variation in species count of the different districts. A difference in species count occurs not only within great distances but also within short distances, a fact previously overlooked, and which substantiates his theory. Little or no migration has taken place westward from the Finnish mainland.—George W. Friedrich.

4909. PLITT, CHARLES C. An ecological study of lichens. Ecology 5: 95-98. 1924.—Differences in the lichen flora of 4 forest communities within 5 miles of each other on Mt. Desert Island, Maine, are described. The more abundant species of a white pine forest (41 spp.), a pitch pine forest (37 spp.), a spruce forest (29 spp.), and an oak forest (21 spp.) are listed in order of their abundance.—J. E. Weaver.

4910. SERNANDER, GRETA. *Parmelia acetabulum* (Neck.) Dub. i Skandinavien. [*Parmelia acetabulum* in Scandinavia.] Svensk Bot. Tidskr. 17: 297-330. Fig. 1-5. 1923.—The work contains an investigation of the distribution and ecology of *P. acetabulum* in Sweden, Norway, Finland, and Denmark. An historical sketch is given and extensive lists as well as maps of localities in the 4 countries. The species has a southern distribution; its northern limit is at about 60°N. In Sweden it occurs preponderantly on lowlands with clayish soil and is rare along the eastern coast, due to its not having reached its eastern limit. The species occurs almost exclusively on dust-impregnated trunks and is rapidly spreading.—O. Heilborn.

FOREST BOTANY AND FORESTRY

W. N. SPARHAWK, *Editor*

(See also in this issue Entries 4868, 4892, 4974, 5240, 5269, 5314)

4911. ANONYMOUS. *Jurisprudence*. Bull. Soc. Centrale Forest. Belgique 30: 153-158. 1923.—Two cases of war-damages are outlined. In 1 the damage to the forested area is estimated, not on the basis of cost of restocking or of the expectation value of the stand destroyed, but on the cost of preparing the land for cultivation. Reimbursement for game destroyed, and for disruption of the management plan was disallowed. The other case was for damages to young plantations. The court held that the expectation value, using an interest rate of 4-5 %, should be used as a basis.—*H. T. Gisborne*.

4912. ANONYMOUS. *Jurisprudence*. Cour des dommages de guerre seant à Bruxelles du 22 Septembre 1921. [Court of war damages sitting at Brussels.] Bull. Soc. Centrale Forest. Belgique 30: 206-211. 1923.—An outline is given of the appeal from a decision by the tribunal at Mons awarding damages for forest growth destroyed by the Germans.—*H. T. Gisborne*.

4913. ANONYMOUS. *Service des aménagements*. Année 1922. [Forest management, 1922.] Bull. Soc. Cent. Forest Belgique 30: 150-152. 1923.—Tables show: (1) progress in revision of management plans; (2) extent of reserved areas; (3) restocking of ruined woods with coniferous and mixed forests; (4) conversion of coppice with standards into high forest; (5) conversion of simple coppice into coppice with standards and into high forest; (6) lengthening of the rotation for coppice under standards; (7) lengthening of the rotation for simple coppice; (8) reduction of the period of return in broad-leaved forests.—*H. T. Gisborne*.

4914. ANONYMOUS. *Sources of supply of divi-divi*. Jour. Roy. Soc. Arts 72: 254-255. 1924.—Divi-divi is the commercial name of the dried seed pods of *Caesalpinia coriaria* of tropical America, which yield 40-45 % tannin.—*J. R. Schramm*.

4915. ANONYMOUS. *Übersicht des Flächeninhaltes und des Holzertrages der Staatsforsten*. [Summary of area and timber yield of state forests (Prussia).] Deutsch. Forstzeitg. 39: 279. 1924.—The gross and productive areas and the yields by districts are shown in a table. The yield from the whole 2,151,484 hectares is fixed at 9,820,974 cubic m. (66 cubic feet per acre).—*W. N. Sparhawk*.

4916. A., H. *Die perennierende Lupine*. [Perennial lupine.] Deutsch. Forstzeitg. 39: 180. 1924.—Lupine sown between the rows in pine and oak plantations stimulated growth of both species.—*W. N. Sparhawk*.

4917. ADAM, J. B. MERCER. *Field crops in Taungya plantations*. Indian Forester 49: 597-600. 1923.

4918. AHLMANN, HANS WILSON. *Norrland, the land of forests, waterfalls, and iron mountains. A study in economic geography*. (Reprinted from Geografiska Annaler, 1921.) 70 p., 20 fig. General Export Association of Sweden: Stockholm, 1922.—Only 1.8 % of the land area of the Norrland provinces is cultivated, and 2.3 % is natural meadow. Hay is grown on more than $\frac{2}{3}$ of the cultivated area, and barley is next in importance. Cattle raising is the principal agricultural industry. Forests occupy 13,332,000 hectares, or 54% of the land. Lumbering on a large scale began with the introduction of steam sawmills (1848-1853). Practically all the virgin timber in private ownership has been cut, and the industry has ceased to expand since about 1900. In some localities it has declined, and with it agriculture, resulting in a decrease of population. The state forests hold the key to future development of the region. The production of charcoal for smelting iron is an important and growing industry and, together with production of pulpwood, is conducive to good silviculture.—*W. N. Sparhawk*.

4919. AURAS. *Der Eichenschälwald und die Stellungnahme zur Frage seiner Erhaltung oder seiner Umwandlung*. [The oak tanbark coppice and the question of its preservation or conversion.] Deutsch. Forstzeitg. 39: 1-5, 21-24. 1924.—Because of the demand for oak bark in the extensive tanneries of the Werra valley (Hesse-Nassau and Saxe-Weimer), most forests have been handled as coppice, usually on a 20-year rotation with cutting once in 10 or 20 years. The introduction of quebracho, imported oak bark, and chrome salts, beginning about 1890, depressed prices of local bark, while the extension of railways led to the substitution of coal

for wood fuel; hence the coppice forests became less profitable. It is now desirable to convert the poorer coppice forests into high forest, which can be done by letting the sprouts grow into standards on fairly good soils; or by clearing and planting more suitable species, especially conifers; or by a combination of the 2 methods. Where it is feasible to help the conifers by cleaning out the sprouts and brush, 2-year transplants of pine and 2-year seedlings of larch should be used, and where such cleaning is impracticable 3-year seedlings or 3-4-year transplants of spruce will do better.—*W. N. Sparhawk.*

4920. BACKE. *Kleinpflanzung von Eichen.* [Planting oaks.] *Deutsch. Forstzeitg.* 39: 141. 1924.—In spite of dry weather, 3-year seedlings of oak were successfully planted. The loss amounted to only 3%.—*W. N. Sparhawk.*

4921. BACKE. *Weidenkultur durch Absenker.* [Propagation of willows by layering.] *Deutsch. Forstzeitg.* 39: 207. 1924.

4922. BAILLAUD, EMILE, ET AL. *Congrès de la production coloniale: Compte-rendus et rapports. Congrès des bois coloniaux.* (26-28 Juin et 8-10 Novembre 1922.) [Reports of the symposium on colonial timbers.] 159 p. Institut Colonial: Marseille, 1922.—An important section of the exposition was devoted to the forest resources of the French colonies. CAMILLE GUY points out the immense extent and value of the forest and the need for systematic exploitation. C. M. JAQUEMET, F. DUCROS, F. PRAX, MARCEL AUBERT, and A. CHEVRIER discuss the problems involved in utilizing, manufacturing, and marketing colonial timbers. It is suggested that the manufacture of ethyl alcohol from inferior species and logging waste offers more promise than dry distillation or pulp manufacture. Only 2% of the timber in the tropical forests is now utilized, whereas at least 40-50% is suitable for exportation to France.—A short paper by ROGER DUCAMP outlines the steps taken to organize the forests of Indo-China, and PICHOR suggests means by which the Ivory Coast can supply France with large quantities of timber. ROGER SARGOS estimates that French Equatorial Africa has at least 6 billion cubic m. of timber suitable for industrial use. He describes in detail the forests along the Kouilou river in Mayombe (French Congo), with tables showing the total volume and the percentages by volume and by number of trees of the important species in the different types of forest. Although there may be over 100 arborescent species on a small area, 9-14 usually comprise the bulk of the stand. Out of about 150 kinds of timber on the concession, 5—*Terminalia superba*, *Vitex pachyphylla*, *Sarcocephalus Trillesii*, *Pachylobus Le Testui* (with *P. fraxinifolius* and *P. edulis*), *Berlinia acuminata* (and *B. bracteosa*)—make up more than $\frac{1}{2}$ of the stand, and 30 include 86% of it. The important species are listed in 7 classes according to possible utilization, color, and density. Other forest products are mentioned, including food plants, spices, oils, rubber, gums and resins, medicinal plants, fibers, dyewoods, and tanning materials.—The forest conditions of Morocco are described in a report by the Moroccan Forest Service, including the extent, distribution, and composition of the forests, their utilization for timber, cork, and other products, and the organization and work of the Forest Service. The cork industry began in 1914.—*W. N. Sparhawk.*

4923. BAKER, R. ST. BARBE. *The forests of Kenya Colony, with special reference to some woods of economic value.* *Jour. Roy. Soc. Arts* 72: 188-189. 1924. (Reprinted from *Jour. Cambridge Univ. Forest. Assoc.*, Dec. 1923.)—Aside from bamboo, forests cover less than 1% of the area of the colony, or only 2,200 square miles. Much of the virgin forest has been cut or culled of the best timber. The most important commercial species are cedar (*Juniperus procera*), which may become the world's chief source of supply of pencil wood, and mangroves (*Rhizophora mucronata* and *Ceriops candolleana*), which are exported to Persia and Arabia for building material. Although hitherto much of the construction timber used in the colony has been imported, there is an increasing tendency to utilize home grown material.—*W. N. Sparhawk.*

4924. BENSKIN, ERNEST. *Afforestation in the United Provinces, India.* 4 + 31 + 133 p., 22 pl., 3 fig. Government Press: Allahabad, 1922.—Reckless cutting, grazing, and burning extending over many centuries have reduced the forests of the United Provinces to 7% of the total land area. Extreme shortage of timber and fuel, as well as of forage, has resulted, and erosion has been most serious, especially in the Gangetic plain. Reforestation has been undertaken especially to check the further spread of ravine areas and to utilize the land

already dissected. This report deals with the history of the work, the methods used, and the results. While more than 40 species have been tried, babul (*Acacia arabica*) has proved the best for sowing on higher slopes and ridges, and shisham (*Dalbergia sissoo*) for sowing and planting in the moister bottoms. Teak (*Tectona grandis*) also did well. [See also Bot. Absts. 12, Entry 395.]—*W. N. Sparhawk.*

4925. BEUTL, E. *Kulturumwandlung, Wiederaufforstung und Torfstreuanwendung als Möglichkeiten zur Hebung der Urproduktion.* [Cultural changes, reforestation and utilization of peat as possibilities in increasing basic production.] *Weiner Allg. Forst- u. Jagdztg.* 41: 68-69, 74. 1923.—The forest area of Austria will probably be reduced, as improved methods are making farming possible on sites not heretofore considered agricultural, and on other sites grazing threatens to pay better than forestry. The remaining forest area must produce more through better silviculture. This will mean more selection or partial cuttings and more careful thinnings instead of clean cutting followed by planting.—It is asserted that peat is superior to forest litter as a bedding material, and that timber growth can be considerably increased by leaving the litter on the ground.—*F. S. Baker.*

4926. BISHOP, J. E. *Research on the physical properties of Australian woods.* *Australian Forest Jour.* 6: 228-234. 1923.—The results of research on the physical properties of Australian woods are considered briefly, and it is recommended that further work be patterned after that conducted by the U. S. A. Forest Service on American timbers. The Commonwealth Institute of Science and Industry is indicated as being the most desirable agency through which to establish such a laboratory.—*C. F. Korstian.*

4927. BROCKWAY, G. E. *Fire control organization and fire fighting operations in Mundaring District.* *Australian Forest Jour.* 6: 257-263. 1923.—Protection from forest fires is a prerequisite to the successful practice of forestry. It must be brought about by prevention through education and by suppression.—*C. F. Korstian.*

4928. BRUCE, DONALD. *The relative cost of yarding small and large timber.* *California Agric. Exp. Sta. Bull.* 371. 36 p., 1923.—It costs 5-8 times as much per thousand board feet to yard logs from 18-inch as from 48-inch trees and for trees below 18 inches in diameter the costs are undoubtedly much higher. The present policy in California is toward closer utilization of small trees. A more conservative plan would be financially profitable.—*A. R. C. Haas.*

4929. BRYANT, RALPH CLEMENT. *Logging. The principles and general methods of operation in the United States.* 2nd ed., xiii + 556 p., 165 fig. John Wiley & Sons: New York; Chapman & Hall, Ltd.: London, 1923.—The methods and equipment used in different regions in harvesting timber and transporting it to the manufacturing plant are described in detail. A 12-page bibliography and a 49-page glossary of terms used in logging are appended.—*W. N. Sparhawk.*

4930. BUSSE. [Rev. of: JUDEICH, FRIEDRICH. *Die Forsteinrichtung.* [Forest regulation.] 8th ed. (MAX NEUMEISTER, editor). Paul Parey: Berlin, 1923.] *Deutsch. Forstzeitg.* 39: 151-153. 1924.—Neumeister fails to mention Biolley's work, and devotes more space to the "Dauerwald," which is a silvicultural measure, than is justified in a book on regulation.—*W. N. Sparhawk.*

4931. BUSSE. [Rev. of: SCHWAPPACH. *Leitfaden der Holzmesskunde.* [Guide to timber measurement.] 3rd ed. Julius Springer: Berlin, 1923.] *Deutsch. Forstzeitg.* 39: 153-154. 1924.

4932. CHARBULA, FR. *Zum Fortschritt in unserem Durchforstungswesen.* [Progress in methods of thinning.] *Wiener Allg. Forst- u. Jagdzeitg.* 42: 13-14. 1924.—Many methods of thinning are used to meet special conditions and for particular purposes. In general, however, 5 degrees of thinning may be recognized, which are briefly described. No stand should be thinned without a careful study of conditions, and the method should be varied according to site conditions, such as character of soil, slope, exposure, and wind, in order that the thinning may be properly correlated with the needs of the stand.—*F. S. Baker.*

4933. COLLEAUX, H. *La regeneration naturelle du hêtre dans la forêt de Soignes.* [Natural reproduction of beech in the forest of Soignes.] *Bull. Soc. Cent. Forest. Belgique* 30: 114-130, 186-199. 1923.—The forest has been under management since about 1545. Clear cutting and planting, with a 100-year rotation, was the rule until 1886. Since then natural regeneration has been attempted with fair success.—*H. T. Gisborne.*

4934. COLLIER, J. V. *Note on the work of extraction of broad gauge sleepers from Nepal.* Indian Forest Rec. 9^o: 349-357. 15 pl. 1923.—A cable transportation system of getting railroad ties is described, with working drawings.—*E. N. Munns.*

4935. COLLINGWOOD, G. H. *Modern Carthage builds a forest.* American City 30: 147-149. 1924.—Carthage, New York, began in 1913 to plant forests on the land surrounding its municipal water supply. Scotch pine and white pine have been planted on 500 acres and eventually the 2,000 acres now owned by the village will be covered. The trees were secured from the State nurseries for 50 cents a thousand and the total cost of establishment averaged about \$8.00 an acre. In addition to constant fire protection *Ribes* have been removed to reduce the danger of white pine blister rust. The trees in the older plantation are 15-20 feet high with stump diameters of 6 inches or more. A list of other New York cities and villages having similar forest plantations is included.—*Author.*

4936. CRAHAY, G. *Les forêts rhénanes dans la zone d'occupation belges.* [The Rhenish forests in the zone of Belgian occupation.] Bull. Soc. Centrale Forest. Belgique 30: 131-143. 1923.—The Rhenish forests cover about 800,000 hectares or about 30% of the province. Because of the absence of large sized resinous timber, wood is imported from Austria, Sweden, Norway, and America. Charcoal, mine timbers, small lumber, and fuel are the principal products of the local forests. Each of the principal state or communal forests is described.—*H. T. Gisborne.*

4937. ECKSTEIN. [Rev. of: ESCHERICH, K. *Die Forstinsekten Mitteleuropas.* (Forest insects of central Europe.) Vol. 2. 663 p., 335 fig. Paul Parey: Berlin, 1923.] Deutsch. Forstzeitg. 39: 100-101. 1924.

4938. ELLIOT, C. SIBLEY. *Problems in the seasoning of hardwoods.* Australian Forest. Jour. 6: 290-294. 1923.—The principles involved in drying hardwood lumber are considered with reference to both air-drying and kiln-drying.—*C. F. Korstian.*

4939. EULEFELD. *Der Maitrieb.* [Spring growth.] Deutsch. Forstzeitg. 39: 99-100. 1924.—Differences in time of beginning of growth in broad-leaved trees may be due to differences in depth to which their roots penetrate. With conifers such differences are probably inherited, depending upon the source of the seed.—*W. N. Sparhawk.*

4940. EULEFELD. *Licht bringt den Pflanzen Leben und auch Tod.* [Light brings life and also death to plants.] Deutsch. Forstzeitg. 39: 149-150. 1924.—The presence of numerous forked trees in old beech stands is attributed partly to the leaving of such trees when thinning, on the theory that they yield more firewood; partly to the struggle for light in youth; and partly to heredity.—It has been observed that tree seedlings or other plants do not grow in spots on which light is reflected from the shiny stems of beech. As the soil in such places is not dry, it is believed that the chemical effect of the light rays rather than the heat inhibits plant growth.—*W. N. Sparhawk.*

4941. FINLAYSON, E. H. *The forests of Canada.* 45 p. Dept. Interior Canada Forestry Branch: Ottawa, 1923.—The main types of Canadian forests are summerized and the area now covered is given, as well as the amount and nature of forest products and of forest industries. Notes on the principal tree species, on existing forestry legislation and on the extent and the administration of forest reserves occupy a considerable portion of the bulletin. Comparisons are made between consumption and increment, the probable duration of timber supplies is estimated, and recommendations are made for protection and development of forests.—*Geo. D. Fuller.*

4942. FLETCHER, T. BAINBRIGGE, AND C. C. GHOSH. *The preservation of wood against termites.* Agric. Res. Inst., Pusa Bull. 110. 705-711. 1921.—Hot creosote was found to be the best preservative. Carbolineum, lead arsenate, mortant, sideroleum, microlineum, solignum, zinc chloride, timborite, lead chromate, siderasthen, Powells' process, and Orr's wood preservative were tested.—*N. J. Giddings.*

4943. FRÖHLICH, JUL. *Aus der Urwaldpraxis. Erfahrungen und Beobachtungen aus den Urwäldern in Bosnia und Siebenbürgen.* [Treatment of virgin forests. Experiences in the virgin forests of Bosnia and Transylvania.] Wiener. Allg. Forst- u. Jagdzeitg. 40: 226-227, 232-233, 238-239. 1922.—Virgin forests in Transylvania and Bosnia have been heavily cut by large foreign companies since about 1880. About 1,000,000 hectares are left. The higher moun-

tains bear stands of spruce and fir. There a so-called selection system of cutting was used, removing most of the larger trees, or about $\frac{1}{2}$ of the total volume. Small material was left, also a certain number of large seed trees and trees left for their protective influence, to prevent too large openings in the canopy. In reality this was a heavy preparatory cutting under a shelterwood system rather than a true selection cutting, because of the fairly even-aged mature and overmature stands. Much of the timber left was broken and splintered in felling the large firs and spruces (150–200 feet tall). Sirocco winds following wet periods also caused heavy windfall. Weeds and bushes have largely occupied the cut-over areas, and but little fir reproduction has come in. Artificial regeneration will be difficult and costly, owing to the remoteness of the locality.—At lower altitudes a mixed type characterized by beech with spruce, fir, pine, or hardwoods was cut over by similar methods. Beech now dominates the whole area as it was cut less heavily than the conifers and is more aggressive. Ash and maple are showing signs of coming back, and occasional firs are seen. In many mixed stands where conifers were left as seed trees, they were windthrown before the forest litter had decomposed enough to make a suitable seedbed. Two ways of regenerating are possible. Clean cutting followed by planting or sowing is entirely feasible. Planting is superior to sowing, especially in the pine, spruce and fir stands, where jungles of weeds and bushes spring up after cutting. When beech is a component of the stand, seedspot sowing can be done in protected places ahead of the cutting to give the conifers a start over the beech. A true selection system, with annual cuttings aiming to remove the old stand in about 40 years, has proved entirely successful, and is very desirable silviculturally. It is not generally practicable on account of the heavy investments required for logging, but can be used in localities where small local mills are supplied from nearby forests.—*F. S. Baker.*

4944. GARDNER, C. A. **The forest formations of Western Australia: 3. The tuart forest.** Australian Forest Jour. 6: 199–202. 1923.—The tuart (*Eucalyptus gomphocephala*) forest occupies a narrow littoral strip about 150 miles long and 5–10 miles wide. The soil, climate, associated species, and characteristics of tuart are discussed.—*C. F. Korstian.*

4945. GARDNER, C. A. **The forest formations of Western Australia: 4. The wandoo forest.** Australian Forest Jour. 6: 296–300. 1923.—The wandoo forest forms a series of associations in which wandoo (*Eucalyptus redunca* var. *elata*) is a dominant component. A number of the common trees of this forest are discussed.—*C. F. Korstian.*

4946. GARDNER, C. A. **The hardwood forests.** Australian Forest Jour. 6: 185–191. 1923.—The 4 important forest formations of Western Australia—sclerophyllous woodlands, savanna woodlands, mallee or mulga bush, and savanna—are discussed chiefly from the standpoint of national economy.—*C. F. Korstian.*

4947. GARDNER, H. M. **Re-afforestation in Kenya Colony by means of shifting cultivation.** Indian Forester 49: 625–628. 1923.

4948. GONZE, P. **La forêt d'Anlier.** [The forest of Anlier.] Bull. Soc. Cent. Forest. Belgique 30: 143–149. Pl. 1–2. 1923.—A brief description is given of the 5,000-hectare forest of Anlier, its soil, and climatic and forest conditions.—*H. T. Gisborne.*

4949. HAASIS, FERDINAND W. **Frost heaving of western yellow pine seedlings.** Ecology 4: 378–390. 5 fig. 1923.—During the winter of 1919–1920 near Flagstaff, Arizona, 3,139 seedlings of western yellow pine, most of which were in their 1st winter, were studied in relation to frost heaving. Sixteen % were killed by heaving (16.5 % of the 1-year seedlings, 8.3% of the older ones). The influencing factors were: character of soil, temperature, moisture, ground-cover, shade, and plant anatomy. The manner in which these factors operate is described.—*Herbert C. Hanson.*

4950. HANSSON, ARNOLD. **Forest fire insurance.** Australian Forest Jour. 6: 172–174. 1923.—The principles and application of forest fire insurance are discussed.—*C. F. Korstian.*

4951. HECK. **Hohenstammzahl durchforstung und freie Durchforstung.** [Thinning based on stem height and "free" thinning.] Forstwiss. Centralbl. 45: 421–427. 1923.—This is a reply to Köhler's criticism of the author's previous article [see Bot. Absts. 12, Entry 3912]. The 2 beech plots referred to were 58 and 59 years old when established (1897), the quality of site was the same, and the trees were of approximately the same height, diameter, and form, but there was some difference in basal area and total volume. Heck's idea is to manage so

as to yield maximum values rather than volumes. To do this, it is desirable to secure as large early returns as possible without sacrificing the growing stock or continuity of yield. In 6 thinnings made since 1897, 301.0 cubic m. of wood, not including branches, was removed from the plot thinned by Heck's method, and 276.9 cubic m. remained. This represents a total yield for 25 years of 348.7 cubic m. per hectare, and for 84 years, 577.9 cubic m. The plot thinned by Kraft's method yielded 179.4 cubic m. in thinnings and had a stand of 348.2 cubic m. at the end of 1922, making the 25-year yield only 284.8 cubic m., and only 527.6 cubic m. for 83 years.—*W. N. Sparhawk.*

4952. HELMS, W. **Tanning industry and wattle cultivation.** *Australian Forest. Jour.* 6: 145-151. 1923.—The practical aspects of the tanning industry are discussed. Plantation-grown wattles (*Acacia* spp.) are preferred to wild grown trees.—*C. F. Korstian.*

4953. HERRMANN. [REV. OF: RUBNER, KONRAD. *Die pflanzengeographischen Grundlagen des Waldbaus.* [The phytogeographic basis of silviculture.] S. Neumann: Neudamm, 1914.] *Deutsch. Forstzeitg.* 39: 81-83. 1924.

4954. HOWARD, S. H. **Height growth of seedlings.** *Indian Forester* 50: 11-15. *Pl.* 2. 1924.—Results of measurements of periodical height growth of trees in plantations are given graphically and in tabular form. There is shown to be a close relationship between temperature, rainfall and growth. Records are given for *Shorea robusta*, *Acacia catechu*, *Dalbergia sissoo*, *Terminalia tomentosa*, and *Bombax malabaricum*. The *Cedrela toona* plantation was ruined by borers.—*E. N. Munns.*

4955. HUFNAGEL, HANS. **Ein verbessertes Verfahren der Baumhöhenmessung mit dem Metermasstabe.** [An improved method of measuring tree heights with a meter scale stick.] *Wiener. Allg. Forst- u. Jagdzeitg.* 40: 225-226. 1922.—Pusch has suggested a simple height measure, consisting of a graduated meter stick. The stick is held vertically, so that the line of sight running past the zero point intersects the base of the tree, and the graduation intersected by the sight to the top of the tree is read. Without moving the ruler, a sight is then taken through the point representing $\frac{1}{10}$ of this reading, to a point on the trunk of the tree. The height of this point above the ground is measured, and multiplied by 10 gives the total height. Hufnagel criticises this method, chiefly because the point measured on the tree is too high for convenience on tall trees. He suggests the following modification: mark a point 1 m. above ground level on the tree to be measured. Stand at a convenient point with a meter stick held vertically at such a distance from the eye that the lines of sight across the bottom and top will fall on the foot and top of the tree, and read the line of sight running to the 1 m. point. Dividing 100 by this reading gives the height of the tree. This method checks well with results secured by the Christen method. It is primarily adapted to a decimal system of measure.—*F. S. Baker.*

4956. HUFNAGEL, L. **Die Berechnung des Waldwertes in der Tschecho-Slowakei für öffentliche Zwecke.** [Valuation of forests in Czecho-Slovakia for public purposes.] *Wiener Allg. Forst- u. Jagdzeitg.* 40: 205-206. 1922.—Cadastral site qualities are compared with silvicultural site qualities, as indicated by growth and yield.—*F. S. Baker.*

4957. JEPSON, WILLIS LINN. **The trees of California.** 2d ed., 240 p., 124 fig. Sather Gate Bookshop: Berkeley, California, 1923.—Besides popular and systematic descriptions of the native trees, a chapter is devoted to the geographic distribution of the California silva, including descriptions of life zones, forest provinces, tree "islands" and effects of fire. The food products from native trees are briefly discussed, and other sections deal with the origin of common and species names and with historic trees.—*W. N. Sparhawk.*

4958. KLIMESCH, JOSEF. **Das Arbeitsprogramm der forstlichen Versuchsanstalt Schwedens für die Jahre 1922-1926.** [Program of work at the forest experiment stations of Sweden for 1922-26.] *Wiener Allg. Forst- u. Jagdzeitg.* 41: 304-305. 1923.—An outline of the current and proposed work is given under 5 main heads: reproduction, development of the stand, diseases and damage, varieties of trees and the suitability of exotics in Sweden, and researches in forest soils. Each of these is subdivided. In general, the work is of a kind to be immediately applicable, fundamental and scientific research being confined mainly to the section of forest soils.—*F. S. Baker.*

4959. KOCHANOWSKI, C. *Bewaldungsverhältnisse in Poland*. [Forest conditions in Poland.] *Wiener Allg. Forst- u. Jagdzeitg.* 40: 267-268. 1922.—Various forest statistics are presented, the first authentic figures given out since Poland became an independent state. These statistics are not complete, however, as they do not cover the Vilna region and the Polish portion of Arva and Zips. The total area of Poland is given as 38,459,000 hectares, of which 23.5% is forested. Most of the forests lie in the eastern provinces, Volhynia and Podolia. The annual yield is estimated to be about 32 million cubic m. of wood (25 million cubic m. of softwoods). The indications are that Poland will be a wood exporter, although the amount may not be very large.—*F. S. Baker.*

4960. LECOMTE, HENRI. *Les bois coloniaux*. [Colonial woods.] ix + 194 p., 28 fig. Armand Colin: Paris, 1923.—Chapter I discusses the structure, chemical composition, physical and mechanical properties, and distinguishing characteristics of woods in general, and gives briefly the characteristics of some colonial woods.—Chapter II lists woods from the several colonies which are suitable for use for cabinet work (mahoganies, rosewood, teak, ebony, and substitutes), interior finish (in general, woods of 0.45-0.80 average density; most Caesalpineae, Mimoseae, and Sapotaceae are not suitable because of structure or hardness), carpentry, flooring, wheels, handles, cooperage, piling, railroad ties, carving and turning, bearings and rollers, shuttles and bobbins, paving, matches, and paper pulp. The author suggests using botanical names rather than local vernacular names for commercial purposes, to avoid confusion. If this cannot be done, he advocates a numerical nomenclature constructed on a decimal system similar to that used in libraries. Such a system, based on botanical classification, will show the relationships of the different woods and at once give a clue to their properties, whereas vernacular names are meaningless or even misleading. Secondary products, including fuelwood, dyewoods, gums, rubber, resins, oils, and tanbarks are mentioned.—Chapter III lists the important species by colonies, for Guiana, French West Africa, Madagascar, Indo-China, and New Caledonia. The general factors affecting exploitation and marketing of tropical woods are discussed, and the early inauguration of systematic forest management is urged. The managed stands succeeding virgin forests should be more homogeneous. The setting aside of virgin areas in each colony, to be kept intact as "botanic reserves," is strongly advocated. A bibliography is appended.—*W. N. Sparhawk.*

4961. LELYVELD, G. VAN. *Invloed van het licht op de kieming der boomzaden I*. [Influence of light on germination of tree seeds I.] *Cultura* 35: 386-393. 1923.—A review.—*J. C. Th. Uphof.*

4962. MCCOX, H. *The control of timber inspection*. *Australian Forest Jour.* 6: 286-289. 1923.—The inspection and grading of lumber and timbers are discussed with particular reference to standard specifications for sleepers (cross-ties), beams, and piles.—*C. F. Korstian.*

4963. McDougall, W. B. *A preliminary key to some forest tree roots*. *Illinois Acad. Sci. Trans.* 14: 87-91. 1921.—This key, which includes 17 species, is based principally on presence or absence of mycorrhizal structures, colors of the root bark, and relative sizes of the ultimate or smallest branches.—*H. W. Anderson.*

4964. MER, EMILE. *L'intervention des branches gourmandes sur la production et la forme des chênes de réserve*. [Effect of "suckers" upon the production and form of oak standards.] *Compt. Rend. Acad. Agric. France* 1920: 595-596. 1920.

4965. MILLER, ROBERT B. *First report on a forestry survey of Illinois*. *Bull. Illinois Nat. Hist. Surv.* 14: 291-374. Pl. 74-100. 1923.—The study covered 697,286 acres in southern Illinois, 175,036 in woodland. Merchantable timber covers 147,636 acres, mostly upland, there being only 16,419 acres of bottomland timber. The annual cut is about 20 million board feet, including lumber, veneer for fruit and vegetable containers, railroad ties, and round mine props. The uplands are more valuable for timber than for farming and are subject to erosion when the forest cover is removed. The forests will reproduce themselves "if fire is kept out for a few years until the slash decays and reproduction is started." The present poor quality of much of the timber and the open stands are largely the result of forest fires.—The trees of commercial value include 5 white oaks, 6 red oaks, 7 hickories, red mulberry, red gum, tupelo gum, black gum, shortleaf pine, bald cypress, red cedar, gray and green ash, hard and soft maple, black walnut, butternut, magnolia, honey locust, basswood, sassafras,

black locust, black cherry, 3 elms, 2 cottonwoods, sycamore, black willow, and a number of minor species such as hornbeam, dogwood, persimmon, and blue beech.—Illinois mines consume about $\frac{1}{4}$ cubic foot of timber to mine each ton of coal, or a total of 20 million feet annually for the State, besides the lumber used for buildings and other construction.—While erosion and grazing present serious problems, protection from fire is of fundamental importance. A fire protection system for this upland timber belt is proposed. The report includes tables of volume and growth for the principal species, and an excellent reference bibliography.—*H. W. Anderson.*

4966. MILLER, ROBERT B., AND GEO. D. FULLER. **Forest conditions in Alexander County, Illinois.** Trans. Illinois Acad. Sci. 14: 92–108. Fig. 1–11, map. 1921.—Geology, topography and soils are discussed. The types of forests are: upland oak, beech-maple, bottom-land or hollow, stream banks, and cypress swamp. Unlike other sections of the State considerable areas in this region are held for forest purposes and little or no grazing is allowed. The chief wood-using industry is the manufacture of veneers for egg crates and for baskets and hampers, extensively used locally for fruits and vegetables. Much of the timber is also used for railroad ties. A forest policy is outlined.—*H. W. Anderson.*

4967. MILLER, ROBERT B., AND GEO. D. FULLER. **Strip survey and growth studies in LaSalle County.** Trans. Illinois Acad. Sci. 12: 273–281. 1920.—Percentages of different species, average numbers of trees per acre, numbers of trees 3 inches or less in diameter, and stands per acre in board feet are given.—*H. W. Anderson.*

4968. MISRA, C. S. **The cultivation of lac in the plains of India.** Agric. Res. Inst. Pusa Bull. 142. 88 p., 23 pl., 14 fig. 1923.—The production of lac is described from the life history of the lac insect, *Tachardia lacca*, to the uses of shellac. A list of the plants upon which lac can be grown, and a glossary of terms used in the lac trade are also given.—*N. J. Giddings.*

4969. MOORE, DON R. **Susceptibility of eucalypts to drought.** Australian Forest. Jour. 6: 171–172. 1923.—The theory is advanced that the mysterious death of several species of eucalypts in the forests of the Kiewa River Valley near Dederang [see Bot. Absts. 13, Entry 142] is probably due to an accumulation in the ground water of salts harmful to plant growth.—*C. F. Korstian.*

4970. ONTARIO, DEPT. OF LANDS, FORESTS AND MINES. **Forestry and forestry in Ontario. Special report to the British Empire Forestry Conference, Ottawa, 1923.** 20 p., 4 pl. Dept. of Lands and Forests: Toronto, 1923.—The extent, composition, and ownership of the forests are described, with notes on the principal trees; forest legislation and administration are outlined. There is also a brief discussion of forest utilization and forest industries.—*W. N. Sparhawk.*

4971. P. **Zur Enteignung der grossen Waldbesetze in Jugoslawien.** [Expropriation of the great forest estates in Jugoslavia.] Wiener Allg. Forst- u. Jagdzeitg. 40: 219–220. 1922.—The Jugoslavian expropriation law of June 28, 1921, covering the great forest estates, is not to be enforced to the letter. Its use will be limited to those cases where private mismanagement threatens public welfare, and to purely protection forests where public values (watershed protection) are preeminent.—*F. S. Baker.*

4972. PARCHMANN. **Die Birke ihre Ausbreitung, Verwendung, bisherige Bedeutung im Holzhandel und ihre Aussicht für die Zukunft.** [Birch—its distribution, utilization, former significance in the timber trade, and future.] Deutsch. Forstzeitg. 39: 168–170. 1924.—Hitherto, birch (*Betula verrucosa* and *B. pubescens*) has been considered a forest weed in many parts of Germany, although of some importance in the eastern districts. The value of its wood became appreciated during the war, and will now probably receive more attention from foresters.—*W. N. Sparhawk.*

4973. PEARSON, R. S. **Sleeper treatment in India.** Indian Forester 50: 71–73. Pl. 3. 1924.—The experimental work on preservative treatment of railroad ties has been a success and the railways are now establishing treating plants. *Pinus longifolia*, *Picea morinda*, and *Abies pindrow* are the most widely used species.—*E. N. Munnis.*

4974. PEPOON, H. S. **The forest lands of Jo Daviess County.** Trans. Illinois Acad. Sci. 12: 183–202. 4 map. 1920.—Nearly all the timber which originally covered the county has been cut. Erosion has resulted and much of the land should be reforested. Nearly all the

northeast slopes are mesophytic or mesotrophic oak associations. The soil is yellow silt loam. A list of 62 species of trees is appended. Maps show types of soil and distribution of trees.—*H. W. Anderson.*

4975. PEREIRA, HUASCAR. *The timber trees of the State of Sao Paulo, Brazil.* 86 p., 28 pl. Department of Agriculture, Commerce, and Public Works: State of Sao Paulo, Brazil, 1921 (?)—For approximately 136 kinds of wood, including a larger number of species, are given vernacular and scientific names, description of the wood, specific gravity resistance to crushing and bending (where known), principal uses, geographical distribution, and miscellaneous observations.—*W. N. Sparhawk.*

4976. PFEIFFER, J. PH. *Werkplan van de commissie van advies en onderzoek in zake Surinaamsche houtsoorten.* [Working plan for Surinam species.] *West Indië* 8: 111-119. 1923.—The forests of Surinam constitute one of its principal resources. Scientific and practical investigations will be made of the soils, forest types, species, density of growth, rate of cutting and exportation, technical properties of the lumber and other products, and potential markets.—*J. C. Th. Uphof.*

4977. PUTICK. *Beiträge zu den Richtlinien der jugoslawischen Forstpolitik.* [Jugoslavian forest policy.] *Wiener Allg. Forst- u. Jagdzeitg.* 40: 294, 296, 302. 1922; 41: 9-10. 1923.—This is a general discussion under the headings: commercial and protection forests, forest ownership, production for local needs and general market, state control of large forest areas. Little definite statistical information is given.—*F. S. Baker.*

4978. RATY, L. *Excursion forestière en 1922.* *Bull. Soc. Cent. Forest. Belgique* 30: 199-206. 1923.—The forests near Spa, Belgium, are described. Fire protection is an important problem, and various kinds of fire-breaks are used. A somewhat unusual arrangement is a system of reservoir and ditches by means of which water is made available for fire-fighting over a considerable area of forest.—*W. N. Sparhawk.*

4979. RECKNAGEL, ARTHUR BERNHARD. *The forests of New York State.* With an introduction by LIBERTY HYDE BAILEY. xv + 167 p., 5 pl., 4 map. Macmillan Co.: New York, 1923.—The book deals with the economic aspects of the forests, their relation to the industrial development of the State, and the development of a state forest policy. A 7-page bibliography is appended.—*W. N. Sparhawk.*

4980. RUŽIČKA, JAROSLAV. *Die Nonne und ihr Ende.* [The nun moth.] *Wiener Allg. Forst- u. Jagdzeitg.* 41: 305-306. 1923.—This is a short résumé of the outbreaks of nun moth in Bohemia in the period 1907-1922. These are ascribed primarily to weather conditions, viz.: periods with warm winds during which birds ate fewer of the moth eggs than usual, and dry summers that favored the development of the insects. The chief reason for a decline in severity of infestation is the prevalence of a disease that is very destructive in wet, cool years, as well as the increase of parasitic and predatory insects. Timber near lakes and marshes has been much freer from damage than elsewhere, as damp atmosphere favors the disease. Sticky bands painted around the trees have not of themselves been entirely effective but have contributed largely to the salvation of many stands of timber, both through their direct effect and by holding caterpillars for a long time on the lower parts of the trees, where they succumb more readily to the disease.—*F. S. Baker.*

4981. SCHEDL. *Praktische Erfahrungen bei Bekämpfung eines verheerenden Barkenkäferanfalles.* [Practical experience in fighting a severe bark beetle attack.] *Wiener Allg. Forst- u. Jagdzeitg.* 40: 211-213. 1920.—Methods of combating an attack of *Typographus* beetles are described. Felled and limbed, and girdled standing trees were used as traps. The insects were killed in the bark by pounding the bark over the beetle holes with hammers. A hollow circular hammer that cut out circles of bark 4 cm. in diameter was also used. The disadvantage of these methods was that they could be used only when the beetle galleries were first started; also, the second required considerable skill. Their advantage lay in the fact that the usefulness of the trap tree was not destroyed as it is when the bark is entirely peeled. Peeling and burning the bark or leaving it in the sun is probably the best means when all factors are considered.—*F. S. Baker.*

4982. SCHIMPKE, J. *Unsere Waldverhältnisse.* [Forest conditions.] *Wiener Allg. Forst- u. Jagdzeitg.* 42: 14-15. 1924.—The purely mathematical and financial aspects of forestry which were popularized by Pressler many years ago have led to unfortunate con-

sequences by placing the financial rotation at the age in which the soil rent culminates, resulting in short rotations of 70-80 years. This is unnatural, especially on poor sites and at higher altitudes where rotations as long as 140 years are necessary to grow trees of requisite size, and has led to shortage of large timbers. A more natural system of management is imperative, but rather difficult under present financial conditions. In many cases clear cutting followed by artificial planting is cheapest, and of a selection system with natural reproduction would be far too expensive to consider at the present time, in spite of its superiority from the standpoint of forest growth.—*F. S. Baker.*

4983. SCHLICH, WM. The regulated selection forest. *Indian Forester* 49: 617-625. 1923.

4984. SCHÜPFER. [Rev. of: ANONYMOUS. Bericht über die XXX Versammlung des Württemb. Forstvereins zu Schorndorf vom 24-25 Mai 1923. [Report of 30th meeting of the Württemberg Forestry Association].] *Forstwiss. Centralbl.* 45: 434-436. 1923.—The meeting dealt with means of increasing production from the forests owned by communes and institutions, which comprise $\frac{1}{3}$ of the total forest area of the State.—*W. N. Sparhawk.*

4985. SCHWAPPACH. Bemerkungen zu den Mitteilungen über Keimfähigkeit des Douglas-samens. [Viability of Douglas fir seed.] *Deutsch. Forstzeitg.* 38: 231-232. 1924.—The seed tested by Auras must have been gathered too late, for instead of a very low percentage of germination, seed from 30-year-old trees should normally be 80-90% viable. Volgmann's theory [see Bot. Absts. 13, Entry 5000] that honeybees affect the fertility of the seed is not tenable, for Douglas fir flowers have no nectar glands.—*W. N. Sparhawk.*

4986. SHEBBEARE, E. O., AND G. W. HOULDING. Forest operations at Sukna, Kurseong Division, Bengal. *Indian Forester* 49: 633-641. *Pl.* 24-25; 193; 50: 1-10. *Pl.* 1. 1924.—The appendix gives generalized tables of planting, yields, and costs.—*E. N. Munns.*

4987. SHOW, S. B. Some results of experimental forest planting in northern California. *Ecology* 5: 83-94. 1924.—The subject is considered under the following heads: method of securing the data, climatic conditions, effect of cover on survival, effect of cover on quality of work in planting, effect of shade on height growth, rodent damage, careless planting and handling, quality of stock, and season of planting. It was observed that brush cover favors survival but that the quality of work improves as brush cover decreases. Manzanita is less detrimental than other kinds of brush. Increased shading results in increased height growth. The percentage of survival is largest with early spring planting and, within limits, with large nursery stock. Rodent damage is most serious in fall plantations and in those on areas burned over more than 3 years before planting.—*T. J. Fitzpatrick.*

4988. SIMONSEN, JOHN LIONEL. The constituents of some Indian essential oils, Part 12: The essential oil from the oleo-resin of *Pinus Merkusi*. *Indian Forest Rec.* 104: 51-57. 1923.—Yields of turpentine and rosin compare favorably with those from other Indian pines. Although the oil has the same constituents as that from *P. longifolia*, they are not present in commercial amounts. The results of the distillations are given.—*E. N. Munns.*

4989. SMYTHIES, E. A. Note on the miscellaneous forests of the Gonda Division, U. P. *Indian Forester* 50: 15-27. 1924.—As a result of fires, overgrazing, and uncontrolled cuttings, erosion has been severe, weedy plants of no value have been encouraged and tree growth has failed to become established. Some of these areas are being reclaimed through protection. The light-demanding species which came in first are now giving way to tolerant ones, on good soils to tree growth, and, on those impoverished by erosion, to thorny shrubs. To assist the valuable species, the forests require management on a shelterwood basis with the object of effecting a succession of crops, i.e., from intolerant to tolerant trees. Artificial reproduction will be necessary in many places, the most difficult task being the reclamation of the badly eroded brushy areas.—*E. N. Munns.*

4990. SMYTHIES, E. A. The evolution of a sal seedling. *Indian Forester* 50: 57-67. 1924.—With complete overhead light, thorough soil working, and freedom from plant competition and animal damage, sal can be successfully reproduced artificially. Natural reproduction requires a seed year accompanied by favorable climatic conditions. Success is greater if the heavy litter and competing brush are destroyed by fire before seeding. Successful natural regeneration requires 5-10 years. On the poorer sites a selection system of cutting is necessary and reproduction is usually very slow, often requiring 25 years.—*E. N. Munns.*

4991. SMYTHIES, E. A., AND S. H. HOWARD. A sal (*Shorea robusta*) yield table for the United Provinces. Indian Forest. Rec. 10³: 27-51. 5 pl., 10 fig. 1924.—The 2 principal factors influencing quality of sal growth are available soil moisture and soil aeration, while distribution and variations in the sal forests bear a close relation to variations in soil character. The table is based on the measurement of 52 plots of 0.3-1.0 acre. Four sites are recognized, using height-growth as the criterion of site quality. Site I includes areas where the maximum trees are over 110 feet tall, and on site IV they are less than 70 feet. Mean annual increment culminates for sites I, II, and III at 37, 47, and 57 years, respectively. The rotations giving the highest yield of "stem timber" (diameter over 8 inches) are 77, 89, and 97 years, when the diameters would average 18.1, 16.7, and 14.8 inches, respectively. The mean annual increment of sal at 40 years exceeds both conifer and hardwood increments in Europe and at later ages is greater than that obtained with Scotch pine or European hardwoods. On site I the yields are 6,910, 9,660, and 11,880 cubic feet at 40, 60 and 100 years, respectively. On site II the yields are 5,850 and 8,670 cubic feet at 50 and 80 years, whereas on site III 4,465, 5,640, and 6,770 cubic feet are obtained at 60, 80 and 100 years.—E. N. Munns.

4992. STEBBING, EDWARD P. Forestry in France. Indian Forester 49: 612-617. 1923.

4993. STEBBING, EDWARD P. The forests of India. In 3 vol. Vol. 1. xv + 548 p., 27 pl., 1 map. Vol. 2. xii + 633 p., 37 pl., 1 map. John Lane, The Bodley Head, Ltd.: London, 1922-1923.—Vol. 1, after a brief outline of the geography and history of India and a description of the character and distribution of the forests, describes in detail the treatment of the forests prior to 1850 and the gradual development of a forest policy between 1850 and 1864.—Vol. 2 covers the development of the Indian Forest Service from 1864 to 1900. Chapters 2 and 15 discuss the education and training of the staff, and Indian forest literature and research (1850-1900) are covered in Chapter 20.—W. N. Sparhawk.

4994. STOATE, T. N. The silvicultural treatment of jarrah forests. Australian Forest. Jour. 6: 215-220. 1923.—Based on both the silvical characteristics of the tree (*Eucalyptus marginata*) and trade requirements, the best silvicultural system is selection cutting by groups.—C. F. Korstian.

4995. TOWNSEND, H. J. The wood of the future: Manufacture and uses of plywood. Australian Forest. Jour. 6: 275-278. 1923.—The production and measurement of plywood are discussed. Plywood has almost entirely supplanted solid wood for making tea chests, because it is much lighter, stronger, and more waterproof. Although employed extensively throughout the world, the use of plywood is still in its infancy.—C. F. Korstian.

4996. TURNBOW, G. D. Comparison of woods for butter boxes. California Agric. Exp. Sta. Bull. 369. 10 p. 1923.—White fir and cottonwood when properly seasoned, paraffined, and lined with parchment, can be used in place of spruce for storing butter in cubes.—A. R. C. Haas.

4997. U. S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE. The national forests of the southern Appalachians. What they mean to the East and South. 24 p., 34 fig., 1 map. Gov't Printing Office, 1923.—Some of the scenic attractions of the 7 national forests are briefly described.—W. N. Sparhawk.

4998. VAHID, S. A. State control of private forests. Indian Forester 49: 583-587. 1923.—Some form of state supervision is considered necessary where the state does not own forests adequate to meet its needs. The leasing of Indian lands for long periods for forestry purposes is a step towards public control.—E. N. Munns.

4999. VESTAL, ARTHUR G. Preliminary account of the forests in Cumberland County, Illinois. Trans. Illinois Acad. Sci. 12: 234-245. 1920.—This county, at the northern edge of the lower Illinoisian plains, contains 2 forest types: pin oak flats and elm-hackberry forest. A table shows the correlation of topography with soil and vegetation. The geographic subdivisions are described in detail.—H. W. Anderson.

5000. VOLGMANN. Keimfähigkeit einheimischen Douglassamens. [Viability of native Douglas fir seed.] Deutsch. Forstzeitg. 39: 207. 1924.—In Germany *Pseudotsuga taxifolia* seed ripens in September and falls in October. As it germinates more slowly than the native pine and spruce, germination tests should run for 40 days. The large proportion of sterile seed is attributed to the absence of honey-bees. For the same reason oak and beech nowadays rarely bear as much fertile seed as they did 100 years ago. [See also Bot. Absts. 13, Entry 4985.]—W. N. Sparhawk.

5001. WATERMAN, WARREN G. A preliminary report on the north two tiers of sections in Niles Township, Cook County, Illinois. Trans. Illinois Acad. Sci. 12: 205-207. 1 map. 1920.—The region includes a little over 9 square miles of which 700 acres still bear original forest trees and 180 acres may be classed as primitive forest.—*H. W. Anderson.*

5002. WHITE, CYRIL T. An elementary text-book of Australian forest botany. Vol. I. iii + 223 p., 105 fig. Forestry Commissioners of New South Wales. Sydney, 1922.—This work is intended especially for the use of Australian forest students and forest officers. Vol. I covers the principles of plant morphology, anatomy, and physiology, leaving taxonomy and ecology for a later volume.—*W. N. Sparhawk.*

GENETICS

ORLAND E. WHITE, *Editor*

(See also in this issue Entries 4775, 4795, 4857, 4881, 4889, 4904, 5064, 5069, 5113, 5227, 5298, 5392, 5393)

5003. ANONYMOUS. Fasciation in *Digitalis*. Australian Nat. 5: 163. 1924.—Casual observation over several years showed a case of fasciation to follow approximately the ratio in Mendel's law.—*T. C. Frye.*

5004. ANONYMOUS. The raising of disease-resisting varieties of citrus plants suitable for the production of citric acid. Rept. Agric. Dept. Dominica 1922/23: 18-19. 1923.—Wither-tip disease is threatening the lime industry. The production of resistant varieties is considered the best means of control, using as one parent *Citrus hystrix*, an immune variety.—*Charlotte Elliott.*

5005. ABBOTT, CHARLES L. What comes from what, or the relationships of animals and plants. 48 p., 10 fig., 41 diagr. Publ. by the Author: 600 Ivy St., St. Paul, Minnesota, 1923.—The author attempts to summarize in concise language present day conceptions of the biological world as to evolution. Scientific names are used with well known popular equivalents or examples where possible. The methods of determining plant and animal relationships are briefly described. The bulk of the booklet consists of diagrammatic representations of the relationships of the larger plant and animal groups, with popular descriptions and familiar examples of each group appended. The diagrams are arranged in a general evolutionary sequence beginning with the low plant and animal forms and ending with man; fossil forms are included. The diagrams are preceded by a geologic time-table. This publication has been issued in a somewhat modified form as a series of wall charts.—*Orland E. White.*

5006. AUMIOT, J. Rajeunissement et perfectionnement de la pomme de terre. [Renewal and improvement of the potato.] Compt. Rend. Acad. Agric. France 1920: 853-857. 1920.

5007. BAUR, ERWIN. Die Bedeutung der Mendelschen Gesetze für die Pflanzenzüchtung. [Significance of Mendel's laws for plant breeding.] Naturwissenschaften 10: 645-646. 1922.—The discovery of the law of segregation changed plant breeding from a purely empirical selection to definitely planned synthetic work. Development of plant breeding depends on the immediate application of the Mendelian laws in practice. Great progress is possible in self-fertilized crop plants by means of combination-breeding, uniting in one sort the advantageous characters existing in different sorts. Nilsson-Ehle's results in breeding wheats for Sweden are the most brilliant achievements thus far. Theoretically easy, this method is certainly difficult in practice because the many unit factors involved often necessitate that years be devoted to searching through large F_2 generations (10-50,000 plants). Combination-breeding is of the greatest importance also in improving cross fertilized crop plants. Valuable new combination types can sometimes be isolated merely by selection, but greater progress will come from definitely planned crosses. This method offers great possibilities of improving crop plants for Germany, e.g., wheat and hops. It is applicable with fruits and especially with flowers and vegetables. The next century will see greater progress in plant breeding than the past 5-6 thousand years. The first to point out the enormous importance of Mendelian laws for plant breeding was E. Tschermak.—*E. B. Babcock.*

5008. BELLING, JOHN, AND A. F. BLAKESLEE. The distribution of chromosomes in tetraploid *Daturas*. *Amer. Nat.* 58: 60-70. 4 fig. 1924.—True tetraploid *Daturas* are those with 4 homologous chromosomes in each set. At the late prophase and 1st metaphase in the pollen-mother-cells, these homologous chromosomes are usually connected in quadrivalents, forming a double ring, intertwined rings, a bent chain, ring and V, a cross, etc. After reduction more than 1,500 pollen-mother-cells were counted, and the chromosomes were in unequal numbers in over 25 % of the cells; the distribution being in these cases mostly 23 and 25, sometimes 22 and 26, and rarely 21 and 27, etc. A calculation showed that the figures agreed with an average non-disjunction (giving a 3 to 1 assortment of chromosomes) of nearly 3% in each quadrivalent. Pollen-grains with 23 and 25 chromosomes were found in the expected proportions. The chromosomes were counted in 62 plants of the progeny of a selfed tetraploid. The majority of these had 48 chromosomes, but there were 5 with 49, 1 with 47, and also 1 which had 48 chromosomes but with more of the irregular divisions. This last was probably a pseudotetraploid (like those found in other lines) with 3 chromosomes in one set and 5 in another. The chromosome numbers of the functional egg cells (as tested by the results of pollinating tetraploids by diploids, and counting the chromosomes of the progeny) showed that about $\frac{1}{4}$ of the egg cells had 23 or 25 chromosomes each. Over 6,000 pollen tetrads gave a percentage of chromosome detachment of 2.3; while the observation of about 1,400 pollen-mother-cells gave 1.6% of detachment at the 1st division. Non-reduction, giving the double number of chromosomes ($4n$ pollen-grains) was found in 0.2% of the microsporocytes.—*John Belling*.

5009. BERNSTEIN, SERGE. *Démonstration mathématique de la loi d'hérédité de Mendel*. [Mathematical demonstration of the Mendelian law.] *Compt. Rend. Acad. Sci. Paris* 177: 528-531. 1923.—The author proves that the Mendelian law is the only law of heredity which will give a stable distribution of the different classes in all successive generations after the 2nd. Beginning with a cross of 2 pure races giving a hybrid 1st generation and then assuming all classes of individuals to have equal fertility, equal death rates and equal probabilities of intermatings, he proves that the Mendelian law and the Mendelian law only, will give the same distribution of different classes in F_2 and all successive generations. Therefore, he states, to verify the Mendelian law in any particular case all that is necessary is to show that a stationary distribution is established from the 2nd generation. [See also following entry.]—*Sylvia L. Parker*.

5010. BERNSTEIN, SERGE. *Principe de stationarité et généralisations de loi de Mendel*. [Principle of stability and generalizations on Mendel's law.] *Compt. Rend. Acad. Sci. Paris* 177: 581-584. 1923.—In this generalization of the author's earlier paper [see preceding entry] he generalizes the proof to the case where the population at the beginning, instead of consisting of only 2 pure types, has n classes of individuals.—*Sylvia L. Parker*.

5011. BRIDGES, C. B., AND T. H. MORGAN. The third chromosome group of mutant characters of *Drosophila melanogaster*. *Carnegie Inst. Washington Publ.* 327. 251 p., 3 pl. (2 col.), 37 fig. 1923.—This work deals with mutant characters in linkage group III, found between Jan. 1910 and July 1922 inclusive. The 91 characters are described in chronological order (about 400 are known in this species) and most of them are illustrated. With descriptions are given comprehensive data on the origin of the characters, their "availability for work," genetic behavior, linkage relations and other features such as those regarding remutations, allelomorphs, interaction, etc. The term "recombination" is introduced to take the place, in part, of "crossover." Recombination classes are what have previously been called crossover classes. The term crossover is used to apply to the chromosome. Crossover percentages are obtained from recombination percentages by correcting for double crossing-over, etc. For securing accurate linkage data the "method of parallel backcrosses" and other special methods are used. These are described in detail. Account is also taken of temperature, age of female parent, relative viability of different classes, etc., and methods are described for eliminating errors due to these. "Considerations upon the relative value of crossing-over data" are given fully, together with a discussion of practical analysis of data in calculating crossover values and making chromosome maps. A system of mean corrections, and curves for converting recombination per cents into crossover values is used.

Detailed chromosome maps are given, in one of which the genes are classified according to their practical value or usability in experiments.—*C. W. Metz.*

5012. BROŽEK, ARTUR. Polymerické dědění skvrn květů reciprokních mísěnců *Mimulus tigrinus-luteus* × *M. quinquevulnerus-rubinus*. [Summary report in a case of cumulative factors in the inheritance of the spots of the flowers in the hybrids of *Mimulus tigrinus-luteus* × *M. quinquevulnerus-rubinus*.] *Preslia* 2: 13-25. 1 pl., 1 fig. 1922 [1923]. [English summary p. 24].—The F₁ from crossing true-breeding strains of the 2 races were intermediate as regards the spotted corolla pattern, the largest spots being in the lower unpaired petal. Although intermediate in general, the F₁ expression of the spotted pattern showed great variability among the flowers in the same plant and among the plants individually. The F₂ showed a still greater range of variability in spotting, giving in addition entirely yellow variates and variates similar to the pure [*M. quinquevulnerus-rubinus*] race. An analysis of the F₃ demonstrated that 18-19% of the 112 F₂ plants were homozygous for various grades of their patterns. On these data, the supposition is advanced that 2 or 3 pairs of cumulative factors are involved in the inheritance of spotting. The F₁ backcrossed with either of the pure parent types gave a progeny the average variability of which was nearer the respective parent type used.—*Orland E. White.*

5013. BURT, B. C., AND NIZAMUDDIN HYDER. The Bundelkhand cottons. Experiments in their improvement by pure line selection. *Agric. Res. Inst. Pusa Bull.* 123. 15 p. 1921.—Selections have been made and tested by methods similar to those used with the Cawnpore-American cottons previously described. One particularly good strain, J. N. 1, was finally secured.—*N. J. Giddings.*

5014. BUTLER, AMOS W. Some families as factors in anti-social conditions. 2nd. Internat. Congress Eugenics. Vol. I, Eugenics, genetics and the family. 387-390. Williams and Wilkins Co.: Baltimore, 1923.—The Board of State Charities in Indiana, established in 1889, has collected data concerning inmates in state and local institutions. The Board also has records of persons sent to county jails, of families receiving out-door poor relief, and of all children born in maternity hospitals. The governor appointed a committee in 1915 to study the whole problem of the mentally defective, including their care. The committee found that an average of 2.1% of the population in 10 counties were feeble-minded, epileptic, or insane. On this basis Indiana has 56,718 mental defectives (44,284 feeble-minded, 8,311 insane, and 4,123 epileptics). The feeble-minded present the greatest problem; there are inadequate facilities for taking care of them. Over ½ the inmates of county poor houses are mental defectives. Many prisoners are feeble-minded. Two to 3% of nearly 1,000 school children tested were feeble-minded. About ¼ of the 20,000 annually aided families include defectives. Families are cited where crime and immorality are associated with feeble-mindedness.—*H. R. Hunt.*

5015. CARRIÈRE, REINHARD. Über Erbllichkeit und Rasseneigentümlichkeit der Finger- und Handlinienmuster. [Heredity and race peculiarities of finger prints and line patterns of the palm.] *Arch. Rass.- u. Gesellschaftsbiol.* 15: 151-155. 1923.—Recent researches have confirmed earlier conclusions that these characters are hereditary and have shown that they indicate race and family peculiarities. The author arranges the lines of finger prints in 3 groups, the proportionate appearance of the 3 groups differing according to race and family. According to his studies the finger prints of the Lapps are near those of the Mongolians. By means of tables he indicates the genealogical method of studying the more important hereditary characters of finger and palm impressions of race-pure individuals and of their bastards. These hereditary characteristics appear in the embryo stage and remain unchanged throughout life.—*Charlotte Elliott.*

5016. CONNORS, C. H. Carnation breeding. *Ann. Rept. New Jersey Agric. Exp. Sta.* 42: 99. 1920/21 [1922].—Several red and purple varieties have proved superior to many that were introduced. In the studies of color inheritance, white single has been obtained as of the 3rd generation and purple seedlings of the 2nd generation. At least 5 types or degrees of maleness have been established and 3 types of femaleness.—*Wm. H. Martin.*

5017. CUNNINGHAM, J. T. Experiments on *Ciona intestinalis*. *Nature* 112: 864-865. 1923.—Relative to amputation work done on siphons of *C. intestinalis* by Kammerer [see Bot. Absts. 13, Entry 1576], the question is put whether any measurements have been made

or published of the original and regenerated siphons [See also Bot. Absts. 13, Entry 5019].—*L. R. Waldron.*

5018. DU RIETZ, G. E. **Stamfasciation hos *Lysimachia vulgaris* L.** [Stem fasciation in *Lysimachia vulgaris*.] *Svensk Bot. Tidskr.* 17: 529-530. 1 fig. 1923.—A brief illustrated description is given.—*Orland E. White.*

5019. FOX, H. MUNRO. **Dr. Kammerer's *Ciona* experiments.** *Nature* 112: 653-654. 1923.—Amputations of siphons of *C. intestinalis* reported by Kammerer [see Bot. Absts. 13, Entry 1576] were repeated by Fox by removing oral siphons from 102 individuals. All trials resulted negatively in that the re-grown siphons in no case were longer than the ones amputated. [See also Bot. Absts. 13, Entry 5017].—*L. R. Waldron.*

5020. GATES, R. R. **Polyploidy.** *British Jour. Exp. Biol.* 1: 153-182. 1924.—This is a summary of facts relating to multiple chromosome numbers in plants and animals. With regard to artificial production, tetraploid cells arose by shaking sea urchin's eggs at the 1st cleavage; and KCl caused the chromosomes of an annelid egg to divide independently of cell or nucleus. Tetraploid cells were also produced by root tips with chloral hydrate. Giant pollen-grains are well known, and giant spermatocytes with the diploid number of chromosomes have been found. Tetraploids have occurred in cultures in *Oenothera* and *Datura*. Tetraploid mosses have been regenerated from the sporophyte, and by crossing such mosses with diploids, triploid sporophytes were obtained. Tetraploid *Solanums* arose from adventitious buds. Occasionally tetraploid cells have been found in root tips and stems. In some genera of plants, the chromosome numbers are in multiples; the multipliers being 2, 3, 4, etc. *Chrysanthemum* is the best example, with 18, 36, 54, 72, and 90 chromosomes. The same is true of the 3 classes of wheat and oats. Other cultivated plants include forms with chromosome numbers in multiples. "Evidence concerning the manner of origin of this condition [tetraploidy] can be obtained by comparative measurements of chromosomes," etc.—*John Belling.*

5021. GINI, CORRADO. **The war from the eugenic point of view.** 2nd. Internat. Congress Eugenics. Vol. II, Eugenics in race and state. 430-431. Williams and Wilkins Co.: Baltimore, 1923.—The writer states very briefly his reasons for believing that the pessimistic conclusions of such men as Jordan and Kellogg, regarding the effects of war upon the development and improvement of the race, tend to be invalidated by new data.—*Charlotte Elliott.*

5022. GLASER, R. W. **The effect of food on longevity and reproduction in flies.** *Jour. Exp. Zool.* 38: 383-412. 1923.—Adult house flies, stable flies, and horn flies, the larval stages having been passed in manure, were kept in bottles and fed different diets: house flies, such diets as raw starch alone, sucrose, protein, sucrose and bouillon, etc.; horse flies, defibrinated cow or horse blood, serum alone, cellular fraction alone. Great differences in longevity and fertility were found with the different foods.—*Sylvia L. Parker.*

5023. HANSON, FRANK B. **Modifications in the albino rat following treatment with alcohol fumes and X-rays; and the problem of their inheritance.** *Proc. Amer. Phil. Soc.* 62: 301-310. 1923.—Starting from a single pair of rats, 2 parallel lines were bred by brother by sister matings for 4 generations. The animals in one line were used as controls, those in the other were treated with alcohol fumes in each generation from the age of 16 days to 100 days. This treatment did not modify the growth curves of the 1st, 2nd, and 4th generations, all of which, tests and controls, were approximately the same. In the 3rd generation the alcohol line began lower than the controls of that generation and this difference was increased as the animals matured. The controls in this generation grew more slowly than in any other. Data on body and tail length are closely correlated with those on weight. A suitable dosage of X-rays has been found by which eye abnormalities, among others, are produced in rats treated *in utero*.—*E. C. MacDowell.*

5024. HANSON, FRANK B., AND VIRGINIA HANDY. **The effects of alcohol fumes on the albino rat: introduction and sterility data for the first treated generation.** *Amer. Nat.* 57: 532-544. 2 fig. 1923.—This is the 1st of a series of papers on the reproduction and growth of 5 generations of rats given daily treatments of alcohol fumes beginning at the age of 16 days. Three females from 1 litter, when daily reduced to a visible state of narcotization by alcohol fumes and mated after about 9 months of this treatment, were sterile. Of 3 females from

another litter, treated in the same way, 2 produced no young that survived and 1 gave 26 young in 4 litters. One of 5 controls, born in the same 2 litters, was sterile; the others gave 86 mice in 12 litters.—*E. C. MacDowell.*

5025. HARROW, BENJAMIN. **Glands in health and disease.** *xiii + 218 p.* E. P. Dutton & Co.: New York, 1923.—This book is a popular presentation of the present day knowledge on the relation of the ductless or endocrine glands to human health, normality, and disease. A chapter each is devoted to the thyroid, the parathyroids, the pituitary gland, and the adrenal glands. One chapter is devoted to the organs of reproduction, their secretions, rejuvenation, etc. The remaining chapters are concerned with the pancreas and the liver; the intestinal hormone; the thymus, spleen, mammary gland, and kidney; the relation of the ductless glands to one another, their influence on growth and metabolism, and the nervous system; organotherapy; plant hormones. A selected list of references classified under the subjects discussed in the book is appended. [See also Bot. Absts. 13, Entry 3429.]—*Orland E. White.*

5026. HARTMAN, C. G., AND W. F. HAMILTON. **A case of true hermaphroditism in the fowl with remarks upon secondary sex characters.** *Jour. Exp. Zool.* 36: 185-203. 2 pl. 1922.—A Rhode Island Red fowl 9 years old is described. This bird possessed an ovotestis on the left side and a testis on the right. Both were apparently functional. This bird behaved like a male before hens but did not tread. Its behavior was hen-like toward chicks and it sang like a hen. Only 1 small elongated egg was recovered from this bird. The ovotestis was found on sectioning to be a mixture of ovarian and testicular tissue, both apparently normal. The testis carried ripe spermatozoa. Both interstitial and luteal cells were found in the ovotestis. The testis is believed to have secreted a hormone influencing the development of the ♂ type of comb and wattles and the behavior of the bird.—*F. A. Hays.*

5027. HARTMANN, MAX. **Untersuchungen über die Morphologie und Physiologie des Formwechsels der Phytomonaden (Volvocales.) III Mitt.: Die dauernd agame Zucht von Eudorina elegans, experimentelle Beiträge zum Befruchtungs- und Todproblem.** [Morphological and physiological investigations of form-alteration in Phytomonadineae (Volvocales) III. Continuous agamic culture of Eudorina elegans; experimental contributions to the problems of fertilization and of death.] *Arch. Protistenk.* 43: 223-286. 2 pl., 7 fig. 1921.—Cells of *Eudorina* grow in light and divide in darkness. The cells of a colony divide substantially simultaneously, the 4 cells at the anterior pole lagging somewhat. The nucleus of a mature cell contains a large "Binnenkörper," a centriole, and a non-staining alveolar structure. The spindle is intranuclear; its formation is preceded by the division of the centriole and the appearance of a central spindle between the daughter centrioles. In the 2nd division (in the formation of a daughter colony), a half-spindle connects centriole and chromosomes before the division of the former. The cilia of the mother cell become separated from the protoplast during cell division, remain attached to the cell membrane for a time, and finally disintegrate. The basal bodies and rhizoplast are resorbed at the same time. After the final division, the pointed end of the nucleus, to which the centriole is attached, is in contact with the cell membrane at the anterior end of the cell. Soon the nucleus withdraws to the central part of the cell, leaving behind a double basal body, from which the cilia grow out. Cell division, at least in the earlier divisions, is longitudinal. In a clone having 1 pyrenoid to a cell, the pyrenoid divides. In clones with several pyrenoids, these are distributed between the daughter cells until only 1 remains; this then divides.—Depression stages are induced by contamination of cultures, by high concentration of the nutrient solution, by continuous illumination, or by the continued use of the same culture glasses during 2 or 3 years. These stages are marked by more rapid division and by the appearance of irregular colonies composed usually of fewer, but occasionally of more, than the usual number (32) of cells. After various unsuccessful attempts, methods of culture were devised, involving illumination for 12 hours daily and the occasional change of culture glasses, which avoided the appearance of depression stages. Under these conditions, new colonies are formed every 5, occasionally in 4, rarely in 6, days; 1,500 successive cell generations have been obtained, without conjugation or other nuclear or cellular "regulation process."—The results show that conjugation is not necessary to the continued existence of a race which in nature repro-

duces sexually. They do not disprove the idea that a rejuvenation or a regulation of the cellular mechanism may be brought about by conjugation; but effects of this nature, if produced by conjugation, are also brought about by other processes, such as encystment. Experiments of R. Hertwig and Jennings are cited as evidence against the theory of the rejuvenating effects of conjugation. Theories of rejuvenation at any rate leave the cause and significance of gametic unions unexplained. Since the theory of amphimixis is one of inheritance and not of gametic union, the author inclines to the Bütschli-Schaudinn hypothesis of sexuality as the best explanation of gametic union.—Earlier experiments of the author and of others are cited as showing that protists die if kept under conditions, otherwise favorable for the vital processes, which prevent division. Senility appears in the individual protist, and reproduction signifies not only an increase in number but also a rejuvenation of the living substance.—C. E. Allen.

5028. HAYS, F. A. **Inbreeding the Rhode Island Red fowl with special reference to winter egg production (preliminary report).** Amer. Nat. 58: 43-59. 1924.—The degree of inbreeding as calculated by Wright's method is considered in relation to winter egg record, winter rate, winter pause, and variability in winter egg production. Winter egg production was found to decline in the 2nd generation of parent-offspring matings. Winter rate declined as inbreeding progressed. The winter pause was not affected by degree of inbreeding. The coefficient of variability in winter egg production decreased as inbreeding progressed. The age at 1st egg was found to increase with degree of inbreeding. Fertility and hatchability of eggs were both affected adversely by inbreeding, the latter more significantly. The number of eggs laid during the winter season depends upon 4 characteristics, namely, maturity, winter pause, intensity, and broodiness. A 7-factor hypothesis is put forward to explain the inheritance of winter egg production. Sexual maturity depends upon 2 dominant genes, *E* and *E'*; the former is sex-linked. Winter pause (winter molt) is inherited on a single dominant factor basis; gene *M* is responsible for its occurrence. Broodiness depends upon 2 dominant factors, *A* and *C*; both must be present to produce broodiness. Winter rate or intensity is also dependent in inheritance upon 2 dominant genes, *R* and *R'*; hens must carry both to possess high intensity. The probable genetic formulae are given for the males and females used as breeders.—Author.

5029. JOHNSON, ALICE M. **The mid-styled form of *Piaropus paniculatus*.** Bull. Torrey Bot. Club 51: 25-28. Fig. 1-2. 1924.—*P. paniculatus* (Spreng.) Small is known only "in the mid-styled form of a trimorphic species," with 2 sets of stamens differentiated. All plants tested with their own pollen from either long or short stamens produced viable seed, and no evidence appeared of "real or inherent differences in the degree of self-compatibility or of cross-incompatibility." This mid-styled form "appears to reproduce true to form through seed progenies."—P. A. Munz.

5030. KELLY, J. [P.] **The physical basis of heredity. Dominant and recessive characteristics: How they arise and how they work.** Flower Grower 11: 82-83. Illus. 1924.

5031. KIESSELBACH, T. A., AND G. C. COOK. **The relative effects of foreign pollen upon the kernel weight of commercial varieties and selfed strains of corn.** Jour. Amer. Soc. Agron. 16: 30-36. 1924.—The method followed was to pollinate 10-15 plants with a mixture of pollen from a number of plants of both varieties tested in each case: 158 dent combinations on 12 standard dent varieties averaged an increase of 0.2%; 13 combinations of dent by other types, including flint, pop, flour and sweet, gave an average reduction of 0.2%. The increase from heterosis in selfed strains is very marked, averaging 11.8% for 8 such strains. The increase due to a change in endosperm type also is very marked. Sweet corn fertilized by starchy corn gave an average increase of 19.9% for 6 such combinations. Two commercial varieties of sweet corn when pollinated by other sweet varieties gave an increase of 1.9%; crossing varieties of flint corn gave similar results. The authors conclude that the failure of these studies to show the marked effects on kernel weight due to heterosis that have been shown by other investigators may be due to 1 or more of 3 causes: (1) a decided error due to place effect resulting from the practice of comparing all pure and hybrid kernels on an ear, rather than comparing them in adjacent pairs; (2) plant individuality may be a factor when results are based on single ears; (3) varieties may differ in their heterozygosity and consequently in their response to foreign pollen.—J. H. Kempton.

5032. LEINATI, LUIGI. *Ricerche sperimentali sulla castrazione*. [Experimental researches on the effects of castration.] Clin. Vet. Rass. Polizia Sanitaria e Igiene (Milan) 44: 635-647. 2 fig. 1921.—This paper gives the result of a series of experiments on the effect of castration on the index of the phagocytosis of the leucocytes. Three dogs were used in each experiment—1 normal, 1 with 1 testicle removed, and 1 with both testicles extirpated. The animal with 1 testicle removed showed a temporary lowering of the index, whereas the dog with both testicles removed showed a permanent loss or lowering of the index. An emulsion in physiological solution made from a testicle of a healthy dog was injected into a dog castrated 60 days before. The value of the index of the phagocytosis increased somewhat but the effect disappeared in 48 hours.—W. S. Anderson.

5033. LEWICKI, S. *O samozapłodnieniu i metodyce krzyżowania pszenicy*. [Self-fertilization and hybridization of wheat.] Pamiętnik Państwowego Instytutu Naukowego Gospodarstwa Wiejskiego w Pulawach. (Mém. Inst. Nation. Polonais Econ. Rurale Pulawy [Kra-ków]). Ser. A. 2: 1-24. 1 fig. 1922. [Summary in French.]—The results indicate that cross fertilization occurs in wheat principally when for some reason self-fertilization is not possible. Tests were made of the relative value of artificial pollination immediately after emasculation as compared with pollination the 2nd, 3rd, and 4th day after emasculation. Good results were obtained from all 4 methods although the results were somewhat more consistent with artificial pollination the 4th day after emasculation.—H. K. Hayes.

5034. LOTSY, J. P., AND K. KUIPER. *A preliminary statement of the results of Mr. Houwink's experiments concerning the origin of some domestic animals*. Genetica 5: 357-375. 2 pl. 1923.—Comparison with previous descriptions indicated that the 2 foundation birds, which had been purchased as bankivas, were not pure. On inbreeding the birds and offspring, this conclusion was verified. The cock probably was a segregate from the cross of a Malay game or domestic hen with a male of *Gallus varius*. The hen might have been a partridge-colored bantam. Other aberrations from normal bankivian type observed on some of the offspring were differences in shank color, comb shape, and the presence of wattles.—L. W. Taylor.

5035. MACBRIDE, E. W. *Experiments on Ciona intestinalis*. Nature 112: 759-760. 1923.—MacBride, commenting on negative results secured by Fox [See Bot. Absts. 13, Entry 5019] in determination of amount of new growth after amputation of the oral siphons of *C. intestinalis*, states that only when both oral and anal siphons are cut, and upon very young animals, do the re-grown siphons attain a length greater than [presumably] normal. [See also Bot. Absts. 13, Entry 5017.]—L. R. Waldron.

5036. MACKLIN, MADGE T. *A description of material from a gynandromorph fowl*. Jour. Exp. Zool. 38: 355-375. 3 pl., 1 fig. 1923.—A bird is described as having the appearance of a hen with ♂ neck feathers and with tail feathers slightly longer than in the normal hen. The comb and right wattles were cock-like and ♂ sexual behavior was exhibited. The bird is supposed to have laid small normal-shaped eggs. The skeleton, head, feet, wing tips, and gonads were sent to the author for study. Measurements and weights show the right side of the skeleton to be larger than the left, giving complete bilateral asymmetry. These differences were observed conspicuously in the skull and in the difference in length of right and left legs. Evidently the right half of the skeleton was of ♂ proportions and the left of ♀ proportions. A histologically normal functioning testis was found on the right side. The ovary from the left side showed a mixture of ovarian and testicular tissue on sectioning. In the central portion of the structure there was a large mass of adrenal tissue. The adrenal tissue showed both cortical and medullar cells but these were more or less intermingled. Some sections showed numerous young oocytes and a moderate number of large ones. Masses of nearly normal testicular tissue were commingled with large amounts of ovarian stroma. Interstitial cells and luteal cells were also found. The bilateral asymmetry is believed to rest not alone on sex hormones but upon the zygotic constitution of the individual. Two theories from Morgan are presented to explain this case. First, in the 1st cleavage of the zygote 1 of the X chromosomes lags behind and is not included in 1 of the cells. The side of the embryo carrying but 1 X would be ♀; the other side ♂. Second, the egg may possess 2 nuclei, 1 carrying X, the other lacking X. Two sperm then fertilize this double-nucleus egg

which gives rise to the embryo. The sex hormones from the right testis may cause the development of some testicular tissues within the ovarian stroma on the left as well as ♂ secondary sex characters.—*F. A. Hays.*

5037. MAYNARD, G. D. A study in human fertility. *Biometrika* 14: 337-354. 3 fig. 1923.—The data analyzed are those of the New Zealand Census Fertility Report of 1918. They show that in the European population of New Zealand the younger the wife at marriage the larger the mean number of children born alive, the larger the number that survive to adult life, and the smaller the percentage of women who bear no children.—*Sylvia L. Parker.*

5038. MOHR, OTTO L. A genetic and cytological analysis of a section deficiency involving four units of the X-chromosome in *Drosophila melanogaster*. *Zeitschr. Indukt. Abstamm.-u. Vererb.* 32: 108-232. 1 pl., 2 fig. 1923.—Notch-8 is a dominant, sex-linked character due to a deficiency in a definite section of the X-chromosome 3.8 units in length, between prune and echinus. It has recessive lethal action and males and homozygous females all die. The loci of white and its 9 allelomorphs, of facet, and of abnormal abdomen come within the deficient section. These manifest themselves in heterozygous condition with Notch-8 and are exaggerated by it. Other sex-linked recessives to left or right are unaffected, save for slight exaggeration of pale eye colors (autosomal as well). Crossing over is normal outside of the deficient section, but entirely suppressed within the section, indicating that the chromosome framework, as well as the genes, is affected. New deficiency phenomena of "exaggeration and dominant character changes" are discussed in detail, as are also hypotheses of deficiency being due to "chain mutation" (simultaneous mutation of series of genes) or to physical loss or inactivation of a section, with the conclusion in favor of loss or inactivation. Deficiency phenomena parallel those in Bridges' case of haploid IV-chromosome in the same species. Potency of deficiency is almost equal to that of the dominant abnormal abdomen gene when the 2 are combined, but deficiency alone does not make the abdomen abnormal in heterozygous females. Several notch-deficiency mutations have occurred. These involve sections of different lengths. All tested include the facet region, but only a few include white, enabling the author to prove that notch characters are due to a localized change to right of the white locus and that exaggeration of white allelomorphs is due to a change in the white locus itself. The absence of the entire X-chromosome (XY and XO males) does not give effects analogous to section deficiency. Primary non-disjunction is not affected by deficiency. Cytological examination reveals no visible abnormality of chromosomes save perhaps a slight narrowing of one X near the central end. Deficiency cases give proof of the linear order of genes. The Notch-8 case presents difficulties for the current explanation of crossing over. "This line of evidence seems to favor the conception that the chromosomes are built up of shorter fragments which are fused end to end. In the crossing over stage these fragments stick together in larger blocks which are exchanged."—*C. W. Metz.*

5039. NAGAI, I. A genetico-physiological study on the formation of anthocyanin and brown pigments in plants. *Jour. Coll. Agric. Imp. Univ. Tokyo* 8: 1-92. 1 pl. 1921.—In the chemical portion of this paper, the author reports the identification of 2 groups of pigment-producing substances in plants. One chromogenic substance he designates as F which includes the glucoside of certain flavones and flavonols. The chemical nature of the other substance, P, is unknown. Anthocyanic pigment is the reduction product of the chromogenic substance F acting alone, although if P is involved there seem to be other possibilities. Certain brown and reddish brown plant pigments (phlobaphenes) are the oxidation products of the chromogenic substances P and F. The genetic phase of the paper deals with the Mendelian inheritance of color in the seeds of rice and soybeans. The following colors in *Oryza* were dealt with: purple, brown, red, yellow, and colorless awns; red and colorless stigma; purple striped and green leaf-sheath; and brown and non-brown ground color of the palea. In the soybean 5 factor pairs for seed coat color are proposed.—*E. W. Lindstrom.*

5040. NEWMANN, H. H. Hybrid vigor, hybrid weakness, and the chromosome theory of heredity. An experimental analysis of the physiology of heredity in the reciprocal crosses between two closely associated species of sea-urchins, *Strongylocentrotus purpuratus* and *S. franciscanus*. *Jour. Exp. Zool.* 37: 169-205. 1 pl., 25 fig. 1923.—*S. purpuratus* ♀ × *S.*

franciscanus ♂ gives many vigorous larvae that are longer lined than those of either pure species but there are also always numerous feeble and non-viable types. This cross exhibits both hybrid vigor and hybrid weakness. The reciprocal cross gives only a few abnormal larvae that develop beyond an early gastrula stage and these give no evidences of paternal heredity. The difference in development of reciprocal crosses is attributed to the overstimulation of the small *S. purpuratus* egg by the large *S. franciscanus* sperm and the understimulation of the large *S. franciscanus* egg by the small *S. purpuratus* sperm. Hybrid vigor is believed to be the result of a summation in the hybrid zygote of the favorable characters of the 2 species; hybrid weakness in the same strains of larvae is attributed to the summation in the zygote of the lethal, semi-lethal or unfavorable genes of both species. The production of monsters by hybridization may be explained on a purely hereditary basis although they are the products of differential inhibition.—*D. F. Jones.*

5041. NILES, HENRY E. **The method of path coefficients—an answer to Wright.** *Genetics* 8: 256-260. 1923.—The author feels that Wright's theory of path coefficients has a philosophically faulty basis in its conception of causation and correlation, and that the method gives nothing which cannot be obtained more reliably by the ordinary correlation method.—*Sylvia L. Parker.*

5042. PEARSON, E. S. **On the variations in personal equation and the correlation of successive judgments.** *Biometrika* 14: 23-102. 20 fig. 1922.—The usual practice in astronomy and physics in treating observations of different persons, has been to use the yearly mean personal equation as a basis of any correction to be applied to observations made in that year, assuming that variations from the personal equation are randomly distributed according to the Gaussian Law. The purpose of the present paper is to discuss the results of experiments devised to test the variations in judgment of one observer to see whether the theory as generally accepted needs revision. The results show both secular and sessional changes which would need to be considered in cases where more refinement is desired.—*Sylvia L. Parker.*

5043. PLUCHET, EMILE. **L'hérédité chez la betterave cultivée.** [Inheritance in cultivated beet.] [Rev. of: VILMORIN, JACQUES DE. *L'hérédité chez la betterave cultivée.* ii + 153 p. Gauthier-Villars: Paris, 1923.] *Bull. Soc. Agric. France* 55: 299-300. 1923.—This is specially advocated for beet-growers.—*Richard Wellington.*

5044. REYNOLDS, BRUCE D. **Interactions of protoplasmic masses in relation to the study of heredity and environment in *Arcella polyopora*.** *Biol. Bull.* 46: 106-140. 1 pl. 1924.—Like *Diffugia*, *Arcella polyopora* will appropriate by fusion pseudopodial fragments which have been severed from the cell-body. When 2 diverging lines, started from sister cells, are kept under similar environmental conditions, cross-fusions will be exhibited between members of 1 line and fragments of protoplasm which have been severed from members of the other line for approximately 22 generations. After that the protoplasts will be attracted to each other, but instead of fusion taking place between them the involved areas will be shattered into bead-like masses. When the conditions in one of the lines are slightly altered, e.g., addition of 1% sucrose, 0.025% Na_2CO_3 , etc., to the culture medium, or by changing the temperature or amount of light, the time required for the shattering reaction to be obtained is reduced to from 6 to 16 generations, depending on the factor altered. When 2 such diverging lines are kept in the same environment, cross fusions between them apparently continue indefinitely. After 2 related lines have become negative to each other they can be brought back to a state of interfusibility by placing them in the same environment. This seems to be independent of whether the individuals concerned present similar morphological appearances or are markedly dissimilar. The evidence obtained in these experiments seems to indicate that physiological variations are produced by environmental conditions and that their permanency depends upon the environment.—*Author.*

5045. SAX, KARL. **The association of size differences with seed-coat pattern and pigmentation in *Phaseolus vulgaris*.** *Genetics* 8: 552-560. 1923.—Crosses were made between 3 lines of *Phaseolus* which bore more or less pigmented large beans, and 2 lines of white beans less than $\frac{1}{2}$ the size. The parents were pure lines, and had been grown in a screened cage for 6 years. The beans of the F_1 plants were too few to be of value for measurement. Mottling factors, extension factors, and factors for black, brown, and purple were assumed. A factor for pig-

mentation was posited, there being a 3 to 1 ratio of pigmented to non-pigmented. In all crosses the non-pigmented F_2 plants bore seed which averaged smaller than those borne by the pigmented plants, there being a total of 3,865 plants in the progenies. In 1 cross the pigmented F_2 plants bore seed averaging 29.0 cgm., whereas the plants with white seed averaged 26.4 cgm. in seed weight. Among these, the 45 plants homozygous for the pigmentation factor, P , bore seed averaging 30.7 cgm., whereas the 80 plants heterozygous for P bore seed averaging 28.3 cgm. Thus that particular one of the factors for large size which is associated with P , controlled when homozygous about 16% of the difference in weight between pigmented and unpigmented, whereas the same factor when heterozygous controlled only about $\frac{1}{2}$ this amount. Thus there is no dominance present in the effect of this particular size factor. The other 2 crosses gave more or less similar results. In a cross of 2 pigmented beans, size was associated with pattern.—*John Belling.*

5046. SCHAFFNER, J. H. **The influence of relative length of daylight on the reversal of sex in hemp.** *Ecology* 4: 323-334. 3 fig. 1923.—Experiments with hemp have led to the conclusion that the ratio of length of daylight to darkness profoundly affects the plant with regard to size, complexity, period of growth, maturity, senility, rejuvenescence, and sexual expression, which is reversed in both directions. Dimorphisms are not caused by hereditary differences but by environmental conditions. Sexual dimorphism is due to reversible states induced by environmental factors, particularly the relative length of the intermittent light period. A long day and a short night induce pure sexual expression whereas a short day and a long night cause sex reversal, the percentage of reversal being roughly inversely proportional to the daylight. The problem of sexuality is a physiological and not a morphological one. The sexual state is changeable and reversible as the environmental factors are changed. Annual, dioecious plants are best for experimental purposes. So far, 2 ecological factors are known to induce sex control and sex reversal: in *Arisaema* through the nutrition and water supply and in *Cannabis* through the ratio of length of daylight to darkness. It is believed that sex is due to some fundamental physical or chemical state in the protoplasm or cell contents of the living cell and that reversal is due to varying the factors of environment.—*T. J. Fitzpatrick.*

5047. SCHAFFNER, J. H. **The time of sex determination in plants.** *Ohio Jour. Sci.* 23: 225-240. 1 fig. 1923.—The author discusses previous work on sex determination and sex reversal. A chart indicates 12 stages in the alternating life cycle when sex determination may occur. Since only 2 of these coincide with chromosome shiftings, it is concluded that Mendelian segregation is not responsible for sex-determination. A characteristic list of plants is appended, including bryophytes, pteridophytes, and spermatophytes, to show the relations existing between the different types of sexual expression.—*H. D. Hooker, Jr.*

5048. SCHEIDT, WALTER. **Anthropologie und Rassenbiologie.** [Anthropology and race biology.] *Arch. Rass.- u. Gesellschaftsbiol.* 14: 416-424. 1923.—Anthropology and race biology in the literal sense mean the same thing. If race biology or race hygiene is not synonymous with anthropology it is still a form of the latter and belongs in the same field of work. The older systematic anthropology is based upon phenotypic characters whereas the newer race biology is based upon genotypic characters. The aim of the 2 methods is the same and can best be approached by a combination of the 2. The question then would be not one of phenotypic or genotypic investigation but what inherited characters are most useful to the human race and best suited to environmental conditions; what share heredity and environment have in shaping these races; and how the origin of these groups, their continuity, and the results of mixtures of races can best be demonstrated. Opportunities should be provided for anthropological investigation of entire families with all means for modern scientific physical measurements, description, and illustrations in genealogical order; an Institute of Race-biology should be provided for this purpose.—Such work would be important in educating the public in personal hygiene. Interesting problems in race science need not be sought at the equator or the poles; they are to be found locally.—*Charlotte Elliott.*

5049. SMITH, G. ELLIOTT. **The study of man.** *Nature* 112: 440-444. 1923.—Knowledge of mankind may be used in constructing a distinct science of man. Recent studies in Egypt reveal the vast attainments of the Egyptians in the 14 century B. C. Evidence at hand shows

the rather wide dispersal of culture in ancient times. Then as now this dispersal was one result of the search for gold and other valuable substances. The study of ancient cultures should be combined with the physical side of anthropology to form a true science of man. Both the psychologist and ethnologist will benefit from the study of folk-lore, myths, customs, etc. To ignore the evolution of mind is to overlook the most important thing in human evolution. With man's known pedigree available, the structural changes in the Primate brain at each stage in his evolution can now be determined. Vision became the first dominant sense. This led to curiosity, which prompted the handling of objects. Vision, touch, and movement provided a knowledge of surrounding objects. All this demanded cerebral development. A mechanism was evolved whereby the eyes were focused automatically. Thus stereoscopic vision arose, with the ability to appreciate form, size, position, etc. With these developments came an expansion in hearing, which opened the way to speech. Speech enabled men to learn from the experiences of others. Such studies in cerebral development will correlate the facts of comparative anatomy and psychology, and will increase the understanding of human behavior.—*H. R. Hunt.*

5050. SPINKS, G. T. **Fruit breeding investigations.** Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta. 1921: 33-41. 1921.—A number of crosses among varieties of apples, pears, currants, gooseberries, raspberries, and tomatoes are recorded. With tomatoes, the F_1 and F_2 generations of a number of crosses are described.—*W. H. Chandler.*

5051. STOCKARD, CHARLES R. **Experimental modification of the germ-plasm and its bearing on the inheritance of acquired characters.** Proc. Amer. Phil. Soc. 62: 311-325. 1923.—There are presented (1) data on the effect of the inhalation of alcohol fumes upon reproduction, survival of young, and production of abnormalities in alternate matings of normal guinea pigs (males and females) with normal and treated mates; (2) data on birth and survival of animals in the 10th, 11th and 12th years of the experiment, in 4 generations following alcohol treatment; (3) data on the effect on the progeny of treated ♂ ancestors as contrasted with treated ♀ ancestors. It is concluded that although the treated animals show no ill somatic effects the germ cells were modified and that a selective elimination has taken place, producing a group of alcoholics in the 4th generation superior to the controls. The abnormalities represent no single genetic change, such as a mutation of the loss of an old character, but rather defects due to unfavorable influences upon development. No evidence to support the theory of the inheritance of acquired characters is furnished.—*E. C. MacDowell.*

5052. STOUT, A. B. **Studies of *Lythrum Salicaria* I. The efficiency of self-pollination.** Amer. Jour. Bot. 10: 440-449. 1924.—Long-styled, mid-styled, and short-styled plants of *L. Salicaria* were each grown in isolation to determine capacity for self-fertilization. Self-compatible plants were found to be most abundant in the mid-styled forms, less so in the long-styled, and least in the short-styled. Wide variations in the degree of self-compatibility were found. A mid-styled plant when selfed with pollen from its long stamens set a very high proportion of pods, but pollen from its short stamens produced almost no fertilization. "Legitimate" cross pollinations were almost always successful. Results obtained in controlled self-pollinations agree in general with those obtained in isolation tests. The author believes that self-compatibility was the primitive condition in this species and that the present complex of sex relations has developed from it.—*E. W. Sinnott.*

5053. TAMMES, TINE. **Das genotypische Verhältniss zwischen dem wilden *Linum angustifolium* und dem Kulturlein, *Linum usitatissimum*.** [The genotypical relation between the wild *L. angustifolium* and the cultivated *L. usitatissimum*.] Genetica 5: 61-76. 1 pl. 1923.—The heredity of 8 independently segregating genes in each of the 2 species has been followed; the characters of the 2 species are very similar. Two of the 8 genes produce the same character expression in each of the species. The identity of a 3rd has not been established, but the remaining 5 genes, although involving the same part of the plant, seem to influence the character more strongly in the wild species. When the 2 species were crossed, the flower color differences did not separate into sharply defined classes in F_2 but indicated the presence of many genes. The individuals in F_2 formed a color series extending from the color of one grand-parental form to that of the other. Although the intermediate types were more numerous than the original color forms, the relative numbers do not accord with the theory on the

basis of 5 gene differences. Four of the genes of *L. usitatissimum* are allelomorphic with the 4 corresponding but more potent genes of the wild species. Because of the genotypical and phenotypical resemblance of these 2 species and the degree of difference shown when compared with other *Linum* species, the author is led to believe that *L. angustifolium* is the wild progenitor of the cultivated flax. The latter developed as the result of a series of gene mutations.—*J. L. Collins.*

5054. TENNENT, DAVID H. Studies on the hybridization of echinoids, *Cidaris tribuloides*. Carnegie Inst. Washington Publ. 312. 42 p., 3 pl., 28 fig. 1922.—Parthenogenetic eggs of *Cidaris* have 19 chromosomes. Half of the spermatozoa contain 19 chromosomes, including a V-shaped one, and half contain 18 chromosomes not including a V-shaped one. Half of the fertilized eggs contain 38 chromosomes, $\frac{1}{2}$ of them 37. Eggs of *Cidaris* are easily fertilized by spermatozoa of *Lytechinus* and *Tripneustes*, belonging to other orders; but the larvae die in the gastrula stage. Some of the paternal chromosomes in cross-fertilized eggs lag in division and are eliminated. Migration of mesenchyme cells into the blastocoele occurs in the hybrid larvae before gastrulation begins, whereas in species-fertilized larvae migration does not occur until after the archenteron is formed. There is also a difference in the place from which the mesenchyme cells migrate. In this respect the hybrids are intermediate. Physical alterations of the cytoplasm occur in hybrid larvae, and are attributed to introduction of foreign enzymes which overburden the nucleus. The disorganization of the hybrids occurs at the stage in which the normal developmental processes of the crossed species begin to diverge. The author adheres to the view that the egg fixes the course of development, although that course may be modified.—*A. Franklin Shull.*

5055. ZADE. Die Anfälligkeit unserer Winterweizensorten gegenüber dem Steinbrand. [The susceptibility of winter wheat varieties to bunt.] Mitteil. Deutsch. Landw. Ges. 38: 666-667. 1923.—Seed of 56 varieties were covered with bunt spores and sown without treatment. During the 4 years 1920-1923 during which this experiment was carried on, only 1 variety, Heils Dickkopf, showed any marked degree of immunity, the number of plants per 100 showing disease being for these years 0, 3, 1.6 and 5. An attempt to isolate an immune strain from the healthy plants of other varieties in which most plants were diseased, failed to give any positive result.—*A. J. Pieters.*

HORTICULTURE

J. H. GOURLEY, *Editor*

JOHN BUSHNELL, *Assistant Editor*

(See also in this issue Entries 4786, 4812, 4877, 4879, 5016, 5050, 5118, 5220, 5306, 5377, 5379, 5380, 5389, 5393, 5398, 5483, 5485, 5502, 5503)

FRUITS AND GENERAL HORTICULTURE

5056. ARMSTRONG, R. P. Pruning experiments with apples. Ann. Rept. New Jersey Agric. Exp. Sta. 42: 88-94. 1920/21 [1922].—In comparing trees (1) thinned during the dormant season, and (2) thinned and headed back, the latter outyielded the former and produced larger fruit in almost every case, but the color of the fruit was inferior. The trees treated by the latter method produced the greatest total twig growth but they became very dense in the tops, requiring severe thinning each spring. Twice as much wood was usually removed from the thinned and cut-back trees as from those merely thinned.—*Wm. H. Martin.*

5057. BAGUI, CRISPULO G. Commercial citrus production in Batangas Province and means of improvement. Philippine Agric. 12: 29-42. 1923.—The author discusses the cultivation of *Citrus nobilis* Lour. (mandarin or naranjita), *C. mitis* Blanco (calamunding), *C. aurantium* L. (cahel), *C. medica* L. (lime), and *C. decumana* L. (pummelo).—*Sam F. Trelease.*

5058. BARKER, B. T. P. Studies on root development. Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta. 1921: 9-20. 1921.—A report is given of the 2nd season's growth of the roots of trees on Broad-leaved Paradise stock; the 1st season's growth was described in the 1920 report. During the 2nd season the root growth was primarily a continuation of the

growth of roots started in the 1st season, very few new adventitious roots starting from the trunk. The nature of the root growth seemed to be influenced by the scion; thus, Allington Pippin on Paradise stock caused a coarse type growth with very few fibrous roots, whereas the less vigorous Stirling Castle caused the growth of many fibrous roots. The roots tended to remain near the surface. Ramming the soil around the roots at transplanting appreciably reduced shoot growth during the 2nd season. Similar experiences at Long Ashton with other trees are recorded. These are in striking disagreement with the results of Pickering. Root growth was studied during the growing season by suspending the roots in 30-gallon casks and automatically spraying nutrient solutions over them about every 5 minutes; the nutrient solution drained into the casks. Root and top growth was very satisfactory with such an arrangement, though neither had been satisfactory when the roots were immersed in the nutrient solution. Root growth began a little earlier than did shoot growth and continued until the reserves in the tree were appreciably lowered. During the remainder of the period of shoot growth, i.e., during June and a part of July, root growth was very slight. After shoot growth ceased, root growth became rather rapid and continued until late autumn. In fact, much the larger part of the root growth of the season was made in late summer and autumn.—Of a number of young currant plants, half were ringed and half left unringed. Bands of cotton, kept moist, were placed around the ringed area and in similar positions on the unringed stems. Plants with such treatment were brought under experimentation at different times throughout the summer. Plants ringed early in the spring made new root growth below and above the ring. Those ringed after the reserves were exhausted made new root growth above the ring. In the unringed plants new roots started under the moist cotton in about 3 weeks after the treatment began; this was true with each set of plants until September, when 4 weeks was required, and the number of roots formed was distinctly less. After Sept. 20, no roots started under the moist cotton on unringed plants. In the ringed plants new roots formed above the ring under the moist cotton more quickly in each succeeding month until July. In July, August, and early September new roots formed within 7 days. As late as Sept. 20, new roots formed in 10 days. The author thinks that with these currant plants, as well as with the apple trees, the rapidity and extent of new root formation was determined by the amount of reserve food in the wood.—*W. H. Chandler.*

5059. BECKWITH, CHARLES S. **Cranberry investigations.** Ann. Rept. New Jersey Agric. Exp. Sta. 42: 389-408. 1920/21 [1922].—Twenty pounds of nitrogen an acre proved more efficient than 30 pounds. Of a complete fertilizer 792 pounds an acre gave greater yield increases than did 1,056 pounds. In a fertilizer test on mud-bottom bogs, phosphoric acid is stated to be the limiting growth factor. Plots receiving lime in 1918 only showed an increased yield over the untreated plot. In the series receiving an application in 1918 and again in 1919, the same effect was observed.—As the result of flooding small plots to a depth of 1 foot and renewing the water promptly, it was found (1) there is no apparent injury to the vines, (2) maturation is retarded, (3) if flooded in the early season, cloudy weather during the flooding period may cause the tips to die back, (4) the number of diseased berries increases, especially when flooded late in the season, (5) some berries, probably less than 5%, break loose from the vines.—*Wm. H. Martin.*

5060. BECKWITH, CHARLES S. **Report of the cranberry substation.** Proc. Amer. Cranberry Growers Ann. Meeting 54: 18-21. 1924.—Tests of a complete fertilizer in varying amounts on Savannah Cranberry land have shown cumulative increases in yields over a 5-year period. In the last year of the period this increase has been about 150% brought about through increased size of fruit (20%), increased productiveness of the tips (30%), and increased number of tips (100%).—The spraying experiment, started the previous year and continued on an area known to be seriously infested with rot, emphasizes 2 points: (1) spraying controls rot on cranberries, and (2) the full benefit of spraying is not apparent the 1st year.—A study of the water table, holding the water at different levels from the surface to 15 inches below, showed that it should be held at least 12 inches below the surface to prevent excess rot.—*J. K. Shaw.*

5061. BETZ, C. **Maulbeerhecken.** [Mulberry hedges.] Möllers Deutsch. Gärtnerzeitg. 38: 266-267. 1923.—The mulberry is grown in Bulgaria for silk-worm food. Seed are planted

during March to secure small plants for transplanting the ensuing autumn. The young trees are pruned back to 5-7 cm. high in order to form bushy plants. The hedges should be trimmed 2-3 times a year.—*J. C. Th. Uphof.*

5062. BLISS, GEORGE S. **Frost on the cranberry bogs.** Proc. Amer. Cranberry Growers Ann. Meeting 54: 9-16. 1924.—Observations at Whitesbog, New Jersey, of weather conditions when there was a possibility of frosts injurious to the cranberry have resulted in a formula by which local observers may determine the probable minimum temperature. The formula used is as follows: $T = D - \frac{H-25}{4} + V - V'$, in which T is the prospective bog minimum tem-

perature, D the p. m. dew point, H the p. m., relative humidity, V a variable depending on the dew point, and V' a variable depending on the humidity. These variables for both spring and fall are given. Application of this formula for 76 radiation nights during 1922 and 1923 shows an average error of 0.4° for spring and of 0.6° for fall conditions. It is believed that the formula and variables will apply with equal accuracy to all bogs in New Jersey with the possible exception of those nearest the coast.—*J. K. Shaw.*

5063. BONAVIA, WM. J. **The progress and trend of agriculture in British Columbia.** Agric. Gaz. Canada 11: 38-40. 1924.—Notes are given on fruit growing and co-operative marketing.—*James E. Chapman.*

5064. BROWN, W. ROBERTSON. **The orange: A trial of stocks at Peshawar.** Agric. Res. Inst. Pusa Bull. 93. 7 p., 12 pl. 1920.—*Citrus limonum* Osbeck and var. "rough lemon" of California and Florida, "khatti" of the Punjab, or "Kharna" of United Provinces; *C. aurantium* Linn.; *C. Limonum* and var. "sweet lime," or "sharbeti," or "mitha"; and *C. medica* Linn. were used as stocks for *C. chinensis* and *C. nobilis*. *C. limonum* Osbeck var. gave the greatest vigor and fruitfulness to the Malta, *C. chinensis*; whereas *C. limonum* var. was in most respects the best stock for the Sangtara, *C. nobilis*. *C. chinensis* on *C. limonum* var. gave dwarf trees with few fruits of high quality.—*N. J. Giddings.*

5065. CONNORS, C. H. **Peach breeding work.** New Jersey Agric. Exp. Sta. Ann. Rept. 42: 83-88. 1920 '21 [1922].—During the season of 1920 about 700 peach seedlings were described for the first time. A list of peach varieties is given and also a list of crosses.—*Wm. H. Martin.*

5066. ESPINO, R. B. **On the germination of coconuts.** Philippine Agric. 11: 191-200. 1923.—Fully ripe coconuts (*Cocos nucifera*) for seed were found superior to nuts at any other stage of development. Nuts with the husk still green may however be used. Removal of the husk gave unsatisfactory results. The nuts should lie on the side, not on end. Seedlings should be transplanted before the shoots have exceeded 30 cm.—*Sam F. Trelease.*

5067. FOLGER, H. **Die Verwendung des Wald- und Edelwildlings bei der Obstbaumpflanzung.** [Wild and improved crabstock for fruit trees.] Mitteil. Deutsch. Landw. Ges. 39: 31-33. 1924.

5068. FRIEDERICH, K. **Verslag over een naar Sumatra's Ostkust.** [Report on a visit to Sumatra's East Coast.] Mededeel. Koffiebessenboeck-Fonds 5. 90-93. 1922.—This report deals with a 2-weeks' visit to many coffee estates. The condition of the coffee trees was found to be more serious than in Java. The writer suggests that after decapitation and sanitation various control measures be taken. Inasmuch as the variety Quillou is known under all circumstances to be most severely infected that variety and other very susceptible ones are not recommended for planting.—*Cecil Yampolsky.*

5069. GEORGESON, C. C. **Production of improved hardy strawberries for Alaska.** Alaska Agric. Exp. Sta. Bull. 4. 13 p., 10 pl. 1923.—This article gives a brief history of strawberry growing in Alaska. The strawberry native to the sandy beaches of the coast (*Fragaria chiloensis*) is dealt with as is also *F. platypetala* of the interior. Both species, but especially *F. chiloensis*, have been used in crossing with cultivated varieties and thousands of hybrids produced. Many of these are of great value for Alaska, being vigorous, hardy, and producing well, the berries being of good quality. Methods of procedure in breeding work are described.—*J. P. Anderson.*

5070. GONZALEZ, LEON G. **The smudging of mango trees and its effects.** Philippine Agric. 12: 15-27. 1923.—*Mangifera indica* Linn. was made to flower at any time of the year by smudging, provided the tree was in condition for forcing. It was the heat and not the smoke

that induced flowering. The number of flowers produced was proportional to the rise in temperature, within the limits of safety from burning the leaves. When less intense heat was applied, the duration of smudging had to be extended to produce flowering and the flowering was less abundant. Smoke drove away insects, but they returned after smudging was stopped. The best time for smudging is between October and December, when the leaves are well developed and the terminal buds dormant and well formed.—*Sam F. Trelease.*

5071. HENDRICKSON, A. H. **Small fruit culture in California.** California Agric. Exp. Sta. Circ. 164. 31 p. 1923.—The present circular is a revision of that published in April, 1917. Varieties of the blackberry, dewberry, red raspberry, black raspberry, currant, gooseberry and strawberry, and the cultural practices for each are considered.—*A. R. C. Haas.*

5072. HUTCHINS, WELLS A. **Irrigation practice in growing small fruits in California.** California Agric. Exp. Sta. Circ. 154. 34 p. 1923.

5073. JUNGE. **Die Veredlungsunterlagen und ihre Anpassungsfähigkeit an den Boden.** [Fruit stocks and their adaptability to soils.] Mitteil. Deutsch. Landw. Ges. 39: 33-38. 1924.

5074. KHARE, J. L. **Ber (*Zizyphus jujuba*) fruit and its fly pest.** Agric. Res. Inst. Pusa Bull. 143. 16 p., 2 charts. 1923.—*Zizyphus jujuba* is a food plant of some importance. The sweeter and seedier varieties are more subject to insect attack than those which contain a large excess of acid. One insect, *Carpomyia vesuviana*, is described in detail and its climatological relations are discussed.—*N. J. Giddings.*

5075. LAVOIE, J. H. **The horticultural service of the Quebec Department of Agriculture.** Agric. Gaz. Canada 11: 30-34. Fig. 1. 1924.—Historical notes are given and the organization and function of the Department are presented by a chart.—*James E. Chapman.*

5076. LORD, E. L. **The grape industry in Florida.** Florida Grower 29¹¹: 4-5. 3 fig. 1924.—The history of grape growing in Florida is given; also cultural directions. Carman, Ellen Scott, Armalaga, and R. W. Munson are recommended for commercial planting. The first 2 are suitable for light soil and the others for heavier soil. The Concord and Niagara have been grafted experimentally with a fair prospect of success. An ideal variety for Florida conditions has not yet been produced.—*J. C. Th. Uphof.*

5077. OLMSTED, FREDERICK LAW, FREDERICK V. COVILLE, HARLAN P. KELSEY. **Standardized plant names; a catalogue of approved scientific and common names of plants in American commerce.** 8vo, xvi + 546 p. American Joint Committee on Horticultural Nomenclature: Salem, Massachusetts, 1923.—The purpose of this work is to bring about, as far as practicable, a uniform nomenclature of the Latin and English names of plants commonly cultivated and in commerce in the U. S. A. Every horticultural organization in America is invited and urged to adopt the standardized plant names. The work consists of an alphabetical list of scientific and common names of cultivated plants including the horticultural varieties in the trade except those of flowering annuals like *Petunia*, *Cosmos*, *Zinnia*, etc., and of vegetables and bulbous plants of which only *Tulipa* is adequately treated. The names approved by the Committee are printed in heavy type if scientific and in small capitals if common. The approved names are generally those used in *Bailey's Standard Cyclopedia of Horticulture* but in case the approved name is different, it is indicated in the synonymy, as are differing names in use in the U. S. Department of Agriculture and at the *Arnold Arboretum*. Therefore it follows that the scientific names are mostly in accord with the *International Rules of Nomenclature*, but there are exceptions, e.g., the adoption of *Hicoria* instead of *Carya*. Other changes are the adoption of a single "i" in the ending of names of species instead of the double "ii" and the disuse of capital letters in specific names. To carry out the intention of the Committee to have an English name for each plant, it has been found necessary to coin a large number of new names, but there are still many plants left without a common name and the Committee welcomes suggestions of suitable ones for insertion in future editions. The adopted names are declared standard for not less than a 5-year period.—*Alfred Rehder.*

5078. PEREN, G. S. **Some observations on the extent of root development in mature fruit trees.** Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta. 1921: 21-32. 1921.—This paper reports the results of a study of the nature and extent of the root systems of old trees. Records are given of the length of main roots and larger lateral roots of a Norwegian cherry tree, 15

years old; a dwarf Bramley's Seedling apple tree, 19 years old that had been transplanted at 9 years of age; 2 unhealthy dwarf, King of the Pippins apple trees, 19 years old; dwarf Pond seedling, Victoria, and Early Transparent Gage plum trees, 16 years old; and 2 young apple trees.—*W. H. Chandler.*

5070. PŠTROŠ, B. *Zušlechťování révy vinné.* [Improvement of the vine in Czechoslovakia.] *Revue Vitic.* 17: unpag. 1923.—The improvement of the vine is an important question, involving the future of viticulture in Czechoslovakia. It is intended to restore the productiveness of the vineyards by a careful choice of the best individuals; to improve native varieties by crossing with the American vine. The most important stocks for Czechoslovakia are the hybrids: Riparia-Berlandieri. It will be necessary to establish stocks best adapted to the soil, climate, etc., containing the hybrids: Riparia-Berlandieri Kober 5 BB for calcareous soils; Portalis for soils of 1st quality; Aramon-Rupestris for pebbly soils; Mourvedre-Rupestris for sandy ground; and Solonis-Riparia for moist ground. The choice will be made by the vine growers, under the management of a special commission organized in each viticultural region, composed of delegates from all the corporations and viticultural institutes, which will register and designate the chosen varieties. It will examine the chosen stock in an institute for the improvement of the vine according to modern scientific methods. The institute will be charged with the crossing of the varieties. The most important question is the choice of the most suitable individuals from Czechoslovakian varieties, which are already beginning to degenerate. The central direction rests in the hands of the Section of Viticulture of the Ministry of Agriculture.—*Jos. Blaha.*

5080. RAGHAVAN, K. K. *Note on pine-apple cultivation.* *Jour. Madras Agric. Students Union* 10: 250-251. 1922.—The method of cultivation of this fruit in a Government farm in South India is described. The varieties grown are Kew, West Indian, Mauritius, and Cochín Local, the last still under trial.—*P. S. Jivanna Rao.*

5081. SCAMMEL, H. B. *Commercial weed killer—its uses on the cranberry bog.* *Amer. Cranberry Growers' Assoc. Proc. Ann. Conv.* 54: unpag. 1923.—A commercial weed killer known as "Key Weed" was applied to cranberry bogs to kill bracken. It was used at strengths of 1:20 applying 200 gallons per acre; and 1:40, applying 400 gallons per acre. It was successful in killing weeds and did not injure the soil, though some cranberry plants were injured through carelessness in applying. The killing agent is arsenite of soda. Directions for preparing arsenite of soda are given.—*J. K. Shaw.*

5082. SMITH, L. B. *Japanese beetle.* *Amer. Cranberry Growers' Assoc. Proc. Ann. Conv.* 54: unpag. 1923.—The Japanese beetle was introduced into Burlington County, New Jersey, previous to 1916. It has spread at the rate of 5-10 miles annually and at the close of 1922 covered an area of 770 square miles. It is omnivorous in its feeding habits and has been found to feed on cranberries and blueberries. Submergence for 2-3 weeks kills the grubs; how much damage to cranberries is likely an open question. Since the beetle emerges at about the time the blueberry ripens it is probable that more or less serious injury may occur. Spraying with a mixture of 4 pounds arsenate of lead and 2 of flour in 50 gallons of water gives a measure of protection. Indications are that an imported Tachinid fly has become established as a parasite and should become sufficiently abundant to cause a material check to the beetle.—*J. K. Shaw.*

5083. STAHEL, G. *De sinaasappelencultuur in Suriname.* [Orange growing in Surinam.] *West Indië* 9: 3-7. 1924.—To encourage orange growing many budded oranges have been distributed among farmers by the experiment station. Pure orange plantations are not recommended because of the labor question. Trees often die as a result of too deep planting and undrained soil. Careful picking and packing of the fruit should be practiced because of the long journey to the European markets.—*J. C. Th. Uphof.*

5084. STAHEL, G. *Gunstige beoordeeling van Surinaamsche King mandarijnen in Nederland.* [Surinam King mandarines in the Netherlands.] *West Indië* 9: 32-33. 1924.—The King is known in Surinam as one of the best varieties and has been favourably received in the Netherlands. Trial shipments have been made of the yellow and red varieties.—*J. C. Th. Uphof.*

5085. STAHEL, G. *Proeven met het oranje kleuren van onze Surinaamsche sinaasappelen.* [Experiments in orange coloring with Surinam oranges.] West Indië 9: 28-31. 1924.—California methods of coloring oranges have been tried in Surinam. Illuminating gas containing 4% ethylene was used and container kept at 28°-30°C. Half green oranges became yellow after 2 days but they never colored satisfactorily. In a 2nd test air was mixed with ethylene gas (1:100) and temperature at 28°-31°C. with good results. A 3rd test of gas 1:200 gave fair results after 3 days' treatment. A 4th lot was kept at 33°C. in a 1:200 gas mixture and after 2 days 12 fruits were entirely orange and the rest, 15, had yellow-green spots but were yellow the next day.—*J. C. Th. Uphof.*

5086. STAHEL, G. *Wenken voor de sinaasappelencultuur.* [Orange growing hints.] West Indië 9: 8-10. 1924.—Orange trees in Surinam should be planted 30 feet apart on fertile sandy soil and 25 feet on less fertile soil. Each tree should be planted on a mound $\frac{1}{2}$ -1 $\frac{1}{2}$ feet high and 4-6 feet across, depending upon the stiffness of the soil. Decomposed coffee pulp may be used for humus, and bordeaux mixture for gum disease. California methods of harvesting are recommended.—*J. C. Th. Uphof.*

5087. STERLING, FRANK. *Statistics on the Citrus plantings in Florida.* Florida State Plant Bd. Quart. Bull. 8: 18-20. 1923.—The number of properties, and orange, grape fruit, tangerine, lime, and kumquat trees are reported for each county and in the State as a whole. There were 30,462 grove properties in 1922. The number of citrus trees in groves is 16,677,227 and the number of acres 253,570.—*J. C. Th. Uphof.*

5088. STOCKLEY, CHARLES L. *A new deal in Florida banana growing.* Florida Grower 29¹²: 4-5. 3 fig. 1924.—The Improved Cavendish banana, suitable for Florida conditions, is described. It produces larger and heavier bunches than the other varieties for this region and has good keeping qualities during and after ripening. Plants of this variety are set 8 × 8 feet (680 hills to the acre). About 25,000 pounds of marketable fruit may be expected from the 1st setting. The 1st fruiting period usually occurs after 15 months, the next after 9 months; the yield is about 100,000 pounds per acre. Maximum bearing is reached by the 3rd year.—*J. C. Th. Uphof.*

5089. SUCHÝ, F. *Ovocnářství na Moravě.* [Fruit-tree culture of Moravia.] *Ovocnické Rozhledy* 14¹⁰: (unpaged). 1923.—In Moravia almost all kinds of fruit can be cultivated, even the most delicate varieties. In the south, in the viticultural region, apricot and peach are planted abundantly. Cherry planting is being extended on account of the export to Vienna. Along the rivers and streams many apple and plum trees are planted. In the region of Brno, where vine culture stops, the apple prevails up to an altitude of 600 m. It gives best results on hills with north exposure. A great number of varieties are found here; pear also succeeds very well. In the district of Haná, with intensive beet culture, fruit trees are cultivated exclusively in gardens. Many sorts of trees are found here planted along roads and field borders. Large expanses are devoted to currants and gooseberries.—In 1906 there were 108,114 plum trees, 35,767 apple, 32,579 cherry, and 11,176 pear; in 1921, 167,668 plum trees, 76,240 apple, 121,814 cherry, and 13,033 pear.—In 1906 there were 25 trees for each km. of road; in 1921, 40.—In 1921 Moravia had 118,759 walnut trees with a crop of 36,052 q.; 589,907 currant and gooseberry bushes with a production of 13,636 q.—In Moravia there are 8 schools of tree culture and horticulture and 540 establishments for the preservation of fruit. There are 300 distilleries, 92 driers, 67 jelly factories.—*Jos. Blaha.*

5090. TÁBORSKÝ, O. *Statistika ovocných stromů v Československu.* [Fruit-tree statistics in Czechoslovakia.] *Ovocnické Rozhledy* 14¹⁰: (unpaged). 1923.—The number of fruit trees in Czechoslovakia is 42,057,275—apple, 9,644,270; pear, 4,723,803; cherry, 3,456,960; plum, 13,327,166—2 $\frac{1}{2}$ trees for each inhabitant. The yield was about 10,627,362 quintals, i.e., 35 kgm. of fruit per inhabitant. The value of the yield per tree in Czechoslovakian crowns is: apple, 100; pear, 80; plum, 136; cherry, 152; the annual expense per tree was about 50. At 200 crowns per quintal, the value of the fruit harvest is 2,125,472,400 crowns. The above statistics are not exact; there are probably 10% more trees. Fifty % of the harvest is manufactured or exported.—*Jos. Blaha.*

5091. UPHOF, J. C. TH. *Het wetenschappelijk pomologisch onderzoek in de Vereenigten Staten.* [Pomological research in the U. S. A.] *Landbouwk. Tijdschr.* 1: 12-31. 1924.—A general review is presented: the bibliography contains 89 titles.—*Author.*

5092. WEISS, HARRY B. **Cranberry report.** Proc. Amer. Cranberry Growers Ann. Meeting 54: 5-9. 1924. [See following entry.]

5093. WEISS, HARRY B. **Special cranberry report.** Amer. Cranberry Growers' Assoc. Proc. Ann. Conv. 54: unpag. 1923.—The Cranberry production for 1923 is estimated as follows: New Jersey, 22,000 barrels; Cape Cod, 320,000 barrels; Wisconsin, 45,000 barrels. A short discussion follows.—*J. K. Shaw.*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

5094. CHEMIN, E. **Naturalisation de quelques plantes aux environs de Caen.** [Naturalization of some plants about Caen.] Bull. Soc. Linn. Normandie 4: 87-96. 1921 [1922].—*Cyclamen neapolitanum*, *Anemone apennina*, *Smyrnium perfoliatum*, and *Symphyltum tuberosum* are concerned.—*M. Denis.*

5095. GEIER, M. **Viola bosniaca und andere Viola Arten.** [Viola bosniaca and other Viola species.] Möllers Deutsch. Gärtnerzeitg. 38: 270-271. 1923.—*V. bosniaca* flowers from April until autumn. It requires a little shade and transplanting in the fall.—*J. C. Th. Uphof.*

5096. HEYNECK, HANS. **Chrysanthemum zum Massenschnitt.** [Chrysanthemum as a cut flower.] Möllers Deutsch. Gärtnerzeitg. 39: 4-5. 1924.—After the flowering of early Chrysanthemums there is often a lack of small flowering sorts. The following varieties are recommended for this purpose: La Triumphante, Golden Glory, Mme. Marques, Heynecks Weisse, Rotkäpchen, and Alice. Usually they are first grown outside and afterwards planted in the greenhouse, where they flower. They are also grown from the beginning in pots.—*J. C. Th. Uphof.*

5097. MÜHLE, ARPAD. **Solanum Wendlandii.** Möllers Deutsch. Gärtnerzeitg. 39: 49-50. 1924.—*S. Wendlandii* is an excellent decorative vine in the greenhouse. It can be propagated in September by cuttings.—*J. C. Th. Uphof.*

5098. PFITZER, W. **Anemone japonica "Schneekönigin."** Möllers Deutsch. Gärtnerzeitg. 29: 33. 1 fig. 1924.—This is a 1924 novelty. The flowers are white and semi-double.—*J. C. Th. Uphof.*

5099. SEMÉE, E., ET [A. L.] LETACQ. **Notes sur l'arboretum du Parc de Vervanie à Condé-sur-Larthe[Orne].** [Notes on the arboretum of the Park of Vervanie at Condé-sur-Larthe, Orne.] Bull. Soc. Linn. Normandie VII, 2: 135-169. 1919.—List of exotic species planted in the Park of Vervanie, with biological or phenological details is given.—*M. Denis.*

5100. YEAGER, A. F., AND FANNY MAHOOD HEATH. **Perennial flowers for North Dakota homes.** North Dakota Agric. Exp. Sta. Bull. 170. 56 p., 27 fig. 1923.—Nearly 400 plants are mentioned with brief notes, and 65 are individually described in a popular manner with common and scientific names. The figures are from original photographs.—*L. R. Waldron.*

VEGETABLE CULTURE

5101. HOFF, J. N. **Celery and other crops adaptable to muck soils from a practical viewpoint.** Jour. Amer. Peat Soc. 17: 30-32. 1924.

5102. POOLE, R. F., AND G. W. FANT. **A study of the relation of various fertilizer mixtures to the growth of celery in muck soils.** Ann. Rept. New Jersey Agric. Exp. Sta. 42: 336-337. 1920/21 [1922].—As the result of growing celery in pot cultures to which the 3 fertilizers were added in various combinations, most efficient results followed the use of a mixture low in ammonia, relatively high in phosphoric acid, and relatively low to medium in potash.—*Wm. H. Martin.*

5103. ROSA, J. T. **Tomato production in California.** California Agric. Exp. Sta. Circ. 263. 19 p. 1923.

5104. SCHERMERHORN, L. G. **Vegetable investigations.** Ann. Rept. New Jersey Agric. Exp. Sta. 42: 94-98. 1920/21 [1922].—Spotted tomato plants yielded 14 tons an acre as compared with 3.6 tons for seedling plants. In a fertilizer test with tomatoes, highest yields resulted on a plot receiving 1,000 pounds of a 4-8-2 combination. In a fertilizer triangle experiment with tomatoes, highest yields followed an application of 1,000 pounds of a 4-6-6 combination. In fertilizer studies with cabbage, highest yields resulted from the use of a complete fertilizer mixture.—*Wm. H. Martin.*

5105. TRENKLE. Notwendigkeit und Wesen der Gemüsesaatenanerkennung. [Need and nature of vegetable seed certification.] Mitteil. Deutsch. Landw. Ges. 38: 584-586. 1923.—In this address the speaker points out the value of high quality seeds for maximum production and the desirability of having these seeds produced under certification.—A. J. Pieters.

HORTICULTURAL PRODUCTS

5106. CRUESS, W. V. Home and farm canning. California Agric. Exp. Sta. Circ. 158. 50 p. 1923.—This revision of a former circular contains detailed information upon the methods of preservation and sterilization of various fruits, vegetables, and meats, together with precautions regarding ptomain and botulinus poisoning.—A. R. C. Haas.

5107. GROVE, OTTO. Cider-making trials—1920-21 season. Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta. 1921: 125-129. 1921.—Experiments in fermenting pasteurised apple juice with pure strains of yeast are reported. While no very satisfactory fruit from which to secure the juice was available, and the results are not very conclusive, they suggest that pasteurisation and fermentation with pure strains will avoid ropiness and other injuries to quality and give a cider with a more desirable flavor.—W. H. Chandler.

MORPHOLOGY, ANATOMY, AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 4781, 5018, 5029, 5047, 5109, 5283, 5286, 5321, 5544, 5558)

5108. BARBAINI, MARIA. Ricerche anatomo-fisiologiche sulle foglie delle "Tillandsia." [Anatomical and physiological researches on the leaves of Tillandsia.] Atti Ist. Bot. Univ. Pavia II, 18: 95-107. Pl. 18-19. 1921.—Leaves of *Tillandsia ixiooides* Gris. reveal an epidermis of 3 layers of characteristic cells, those of the 1st layer each containing a highly refractive siliceous body. Palisade cells are lacking, being replaced by an aquiferous tissue 3-4 cells thick. This tissue was very rarely found on the under side of the leaf. Spongy parenchyma forms $\frac{2}{5}$ of the thickness, containing chloroplasts and elaioplasts. Stomata are few in number, sunk to the plane of the 2nd epidermal layer, each stomatal depression having 2 scales on the sides covering the depression. *T. dianthoidea* Ros. differs slightly from the above. The epidermis consists of 2 layers of cells; the cells of the 1st layer do not contain the siliceous body. Experiments on the absorption of water and nutritive substances through the leaves of these plants show that water containing methylene blue was absorbed by means of the scales and was found in the epidermal and aquiferous cells. The author concludes that epiphytic plants absorb water exclusively by means of the leaves.—P. D. Caldis.

5109. BOWMAN, H. H. M. The distribution and pollination of certain sea-grasses. Papers Michigan Acad. Sci. 2: 3-10. Pl. 1-4, fig. 1-2. 1923.—The term "sea grasses" is used to include the strictly marine species of Hydrocharitaceae and Potamogetonaceae, of which 8 genera and 30 species are known. Seven species are known from North America, 6 being confined to the Gulf of Mexico and adjacent waters. The American species grow at depths of 2-20 feet for 1 species, 20-35 feet for another species, and 96-108 feet for another. The close similarity of some of these to those of the Australasian waters is taken as another indication of the probable existence at one time of connection between the Caribbean Sea and the Pacific Ocean. Most sea grasses are dioecious and the flowers of both sexes are known for but few species. The author collected both kinds of flowers in *Thalassia testudinum*, which forms great "meadows" in shallow waters in the West Indian region and as far north as Key West. The pollen grains are spherical and are packed in the anther sacks in coiled spiral moniliform threads. At maturity these threads escape into the water, where the outer walls gelatinize. This mucus-like material contains pollen grains in various stages of germination.—Ernst A. Bessey.

5110. BUGNON, P. L'organisation libéroligneuse des cotylédons et de l'hypocotyle expliquée par la théorie du raccord chez la mercuriale (*Mercurialis annua* L.). [The fibrovascular organization of the cotyledons and the hypocotyl explained by the theory of union in *Mercurialis*

annua.] Bull. Soc. Linn. Normandie VII. 5: 69-106. 2 pl., fig. 1-4. 1922. —The author discusses (1) general considerations which justify the theory of union (raccord) both from the point of view of morphology and of phylogeny; (2) phylogenetic theories of the fibrovascular organization of cotyledons and hypocotyl; (3) the purpose of his own researches; (4) facts which justify the application of the theory of union in the case of *Mercurialis*; (5) the application of the theory of union to the interpretation of the fibrovascular structure of the cotyledons and hypocotyl in *Mercurialis*; and (6) a special critique of the theory of precocious dichotomy and of the theory of basifugal acceleration. "The theory of union seems at present to be the best working hypothesis for a study of the important phylogenetic problems presented by the organization of the embryo and the seedling in seed plants."—*M. Denis*.

5111. CHEMIN, E. Anomalies florales dans le genre *Daphne*. [Floral anomalies in *Daphne*.] Bull. Soc. Linn. Normandie VII. 3: 218-239. 1920.—Floral anomalies are described in *D. Laurea* and *D. Mezereum*, consisting of cases of concrescence between neighboring flowers, concrescence between members of the same flower, division of floral parts, and fasciation.—*M. Denis*.

5112. DENIS, M. Sur le polymorphisme de l'*Euphorbia stenoclada* H. Bn. [Polymorphism in *Euphorbia stenoclada*.] Bull. Soc. Linn. Normandie 4: 133-141. 2 pl., 2 fig. 1921 [1922].—*E. stenoclada* of Madagascar shows considerable ontogenetic and environmental polymorphism, which has led authorities to describe falsely, as distinct varieties, developmental states or morphoses of the same species. A fasciated specimen was found on guano.—*M. Denis*.

5113. GERBAULT, E. L. Fasciation et pélorisation partielle d'un *Delphinium vivace*. [Fasciation and partial peloria in a perennial *Delphinium*.] Bull. Soc. Linn. Normandie VII. 2: 28-33. 1919.—Fasciation was observed in a perennial *Delphinium* with simple flowers cultivated from 1913 to 1916. After the hard winter of 1916-1917 no fasciation appeared but the flowers were larger than usual and displayed peloric anomalies. One may agree with N. Bernard that there is a predisposition to fasciation, i.e., this condition depends primarily on the genetic constitution of the plant. There may be a later change in thermotonus due to disturbed conditions. Fasciation again enters the category of puzzling phenomena.—*N. Denis*.

5114. LAURENT, VIVI. Zur Entwicklungsgeschichte von *Corytoloma cyclophyllum* Dus. n. sp. ined. [Life history of *Corytoloma cyclophyllum*.] Svensk. Bot. Tidskr. 17: 165-174. Fig. 1-3. 1923.—The embryo-sac of this plant (Gesneriaceae) is of the normal type and has a characteristic shape with a stout upper portion and an elongated lower portion. Fertilization is porogamous. The fertilized egg grows as a long tube into the endosperm and later gives rise to an embryo lying free in the cellular endosperm. A large endosperm cell with 2 nuclei grows out to a unicellular chalazal haustorium. In the micropylar end of the endosperm a haustorium of 2 uninucleate cells arises. An analogous development is found among certain Labiatae but has not yet been noted in the Scrophulariaceae, though the latter family is regarded as more nearly related to the Gesneriaceae.—*O. Heilborn*.

5115. SOUÈGES, RÉNE. Embryogénie des Salicacées. Développement de l'embryon chez le *Salix triandra* L. [Development of the embryo of *Salix triandra*.] Compt. Rend. Acad. Sci. Paris 177: 1234-1237. Fig. 1-24. 1923.—The development closely resembles that of the Polygonaceae. A complete series of figures of development is given.—*C. H. Farr*.

5116. VUILLEMIN, PAUL. Nouvelles preuves de l'origine dystrophique des scyphies. [New proof of the dystrophic origin of cup-galls.] Compt. Rend. Acad. Sci. Paris 177: 999-1001. 1923.—Leaves modified into the form of horns or cups are found to be hypotrophic formations or results of failure to develop, in distinction to the insect galls with which they were for a long time confused. A description is given of these malformations in a number of forms especially in *Tilia silvestris* and *Aucuba japonica*. In the latter they are thought to be due to the premature development of the buds.—*C. H. Farr*.

5117. WATERMAN, W. G. Note on juvenile leaves in *Thuja occidentalis*. Trans. Illinois Acad. Sci. 14: 85-86. Fig. 1-2. 1921.—The juvenile leaves of *T. occidentalis* are quite different in character from those produced later. When a plant was allowed to dry out until partially dead and then revived, the juvenile shoots were commonly produced both on the ends of the old shoots and from the main stem.—*H. W. Anderson*.

5118. YOUNGKEN, H. W. Studies on the Greater Yam (*Dioscorea alata* L.). Amer. Jour. Pharm. 95: 678-684. 4 fig. 1923.—This is a morphological and histological study of the tuber of the Greater Yam. Several species of the true yams have been long under cultivation in China, India, South America, the West Indies and the Pacific Islands.—Anton Hogstad Jr.

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*

L. H. TIFFANY, *Assistant Editor*

(See also in this issue Entries 5027, 5372, 5373, 5486, 5487, 5491, 5605)

5119. ANONYMOUS. Copper sulphate treatment for algal growths. (Discussion.) Jour. Amer. Water Works Assoc. 11: 258-265. 1924.—In the verbatim report of several with experience, there is general agreement that CuSO_4 is beneficial for destroying algae. When used in extremely small quantities in lakes it is difficult to get even distribution. In lakes the small shallow bays are often incubators for algae and these places should be watched and treated more frequently than the lake as a whole. In small reservoirs through which water passes quickly, and where the introduced water contains algae, best results follow very frequent or continuous treatment. If the troublesome algae reproduce in the reservoir, beneficial results may be obtained by occasionally washing the walls with a strong solution of CuSO_4 and flushing off with a hose before readmitting water.—N. L. Huff.

5120. ALLORGE, P. Une pêche planctonique dans l'Erdre. [Plankton fishing in the Erdre.] Bull. Mayenne Sci. 1922: 118-122. 2 fig. 1923.—A single fishing in the Erdre, in the environs of Nantes, yielded plankton dominated by Myxophyceae and Chlorophyceae. *Chroococcus limneticus*, *Microcystis aeruginosa*, *Melosira italica*, *M. granulata*, *Asterionella gracillima*, *Pediastrum simplex radians* are most abundant; 7 species and varieties are reported new for the French flora.—M. Denis.

5121. ANDRÉ, EMILE. Appareil pour la prise des échantillons de Limon lacustre. [Apparatus for collecting deep sea ooze.] Ann. Biol. Lacustre 12: 41-48. 1923.—Description and explanation are given of a new dredging apparatus.—N. Carter.

5122. BISCHOFF, BERNHARDT. Das Pflanzenplankton im unteren Dnieper bei Alexandrowsk (Ukraine). [The plankton flora of the lower Dnieper at Alexandrowsk.] Bot. Archiv 1: 107-125. 1922.—Of 132 genera represented, the distribution was as follows: Schizophyceae 2, Bacillariales 56, Flagellatae 20, Dinoflagellatae 3, Chlorophyceae 51. The Chlorophyceae included the following: Tetrasporeae 3, Protococcales 34, Ulotrichales 2, Microsporaes 1, Conjugatae 10.—William Seifriz.

5123. CHATTON, EDOUARD. Les Peridiniens parasites des Radiolaires. [The Peridinia parasitic on Radiolarians.] Compt. Rend. Acad. Sci. Paris 177: 1246-1249. Fig. 1-3. 1923.—Description and figures are given of *Collozoum inerne*, *Merodinium Brantii*, *Merodinium mendax*, and *Myrosphaera caerulea*. They live as parasites on the nucleus and the cytoplasm of the central capsule.—C. H. Farr.

5124. CHEETHAM, CHRIS. A. Yorkshire Naturalists Union: Botanical Section, annual meeting, Oct. 15, 1921. Naturalist 1921: 408. 1921.—J. W. H. JOHNSON mentioned the seasonal occurrence in great quantity of *Tetraspora gelatinosa* in isolated sections of Gordale Beck and Airehead; also the abundance of a bacterium, *Microspora amoeba*, in association with the alga. R. W. BUTCHER recorded the presence of *Tetraspora gelatinosa* in his dredgings from the wharf at Harewood Bridge at a period of the year immediately following the break up of the masses in the Upper Aire.—W. H. Burrell.

5125. CHEMIN, E. Algues rares ou nouvelles pour la région de Luc-sur-Mer. [Rare or new algae in the region of Luc-sur-Mer.] Bull. Soc. Linn. Normandie VII, 4: 120-129. 1921 [1922].

5126. CHEMIN, E. Les algues de profondeur. [Algae of the deep.] Bull. Soc. Linn. Normandie VII, 3: 282-288. 1920.—A list is given of Chlorophyceae, Phaeophyceae, and Floridaceae, dredged off Luc-sur-Mer (Calvados) at depths of 2-3 m.—M. Denis.

5127. FRÉMY, P. Algues croissant sur des Muscinées de Madagascar. [Algae growing on mosses from Madagascar.] Bull. Soc. Linn. Normandie VII, 5: 38-39. 1922.—*Symploca muscorum*, *Scytonema javanicum*, *Calothrix thermalis*, *Nostoc sphaericum*, probably new for Madagascar, are announced as found on various mosses occurring in Madagascar.—*M. Denis*.

5128. FRÉMY, P. Espèces nouvelles pour la flore algologique des Pyrénées. [New species for the algal flora of Pyrenes.] Bull. Soc. Linn. Normandie VII, 5: 37-38. 1922.—*Nostoc sphaericum*, *Scytonema myochrons*, *S. figuratum*, *S. densum*, *Dichothrix gypsicola*, *Trentepohlia aurea* f. *setigera*, *Microspora subetacea* are said to be new for the Pyrenees.—*M. Denis*.

5129. FRÉMY, P. Sur la présence, aux environs de Cherbourg, de *Oscillatoria* *Corallinae* Gomont. [Oscillatoria Corallinae near Cherbourg.] Bull. Soc. Linn. Normandie VII, 4: 109-110. 1921 [1922].—*O. Corallinae* was found on *Catenella Opuntia*.—*M. Denis*.

5130. HALL, R. P. Morphology and binary fission of *Menoidium incurvum* (Fres.) Klebs. Univ. California Publ. Zool. 20: 447-476. Pl. 40-41, 2 fig. 1923.—*M. incurvum* is a small, saprozoic, euglenoid flagellate with 1 flagellum arising at the base of the gullet, and with a rigid striated periplast. The flagellum arises from a blepharoplast, and a rhizoplast extends from this to the centrosome on the nuclear membrane. At mitosis there is a parademose connecting the blepharoplasts, as in *Trichomonas*. This is the 1st observation of the parademose in euglenoids. The resting nucleus is of a vesicular euglenoid type, with a central endosome. Twelve chromosomes are organized from the peripheral granules, split in the metaphase, and form V's which unfold and migrate to the poles. The endosome contains no centriole such as has been described in many euglenoids. It constricts at mitosis and is distributed to the 2 daughter nuclei.—*Harold Kirby*.

5131. HENTSCHEL, ERNST. Der Bewuchs an Seeschiffen. [The growths on sea-faring boats.] Internat. Rev. Ges. Hydrobiol. u. Hydrograph. 11: 238-264. 1923.—Growth of algae and animals from 48 boats were investigated; 5 genera of algae and many animals were represented. The peculiar conditions of growth to which the organisms are subjected in this habitat are discussed, as also the modifications which result therefrom.—*N. Carter*.

5132. KOFOID, C. A., AND O. SWEZY. Mitosis and fission in the active and encysted phases of *Giardia enterica* (Grassi) of man, with a discussion of the method of origin of bilateral symmetry in the polymastigote flagellates. Univ. California Publ. Zool. 20: 199-234. Pl. 23-26, 11 fig. 1922.—The name *Giardia enterica* is used for the parasite widely known as *Lambia intestinalis*. The body is pyriform, with a sucker like cytostome, contracted posteriorly to a tapering tail. Dorsally it is convex, ventrally flat. There are 2 nuclei, the cytostome, and a neuromotor apparatus consisting of 2 axostyles, 2 parabasal bodies, a peristomial fiber, the centrosome, rhizoplasts, blepharoplasts, and 8 flagella. Thus the system is bilateral, the parts of the right side arranged into a mirror image of those of the left. A transverse commissure between the blepharoplasts joins the systems, as well as the juncture at the anterior end. There are 4 chromosomes, and a parademose joining the centrosomes in division. Encystment often occurs, and in the cyst multiple mitosis to an 8-zooid stage. Multiple somatellars of 2 types appear in the polymastigotes, distinct from the dendritic somatella of *Dinobryon*, the radial of *Synura*, the plate of *Gonium*, the ellipsoid of *Pandorina*, and the sphere of *Volvox*. The right side of *Giardia* is similar to *Cholomastix*. A morphological reversal would be necessary for the derivation of the left side from such a type. The steno-metric relations here recall those of levulose and dextrose, and of sinistral and dextral albuminoids.—*Harold Kirby*.

5133. KOFOID, C. A., AND O. SWEZY. On the morphology and behavior of *Pentatrichomonas ardinelti* (Derrieu & Raynaud). Univ. California Publ. Zool. 20: 373-390. Pl. 37, 1 fig. 1923.—There have been 2 methods in the evolution of the polymastigote flagellates: increase in number of flagella, and specialization in structure and function among the flagella. These modes of development of flagella may be studied in *Pentatrichomonas*, which is a human intestinal flagellate producing the trichomonad diarrhoea. There are 4 anterior flagella in a cluster, 1 independent flagellum, and an undulating membrane. The cluster of anterior flagella beats at the rate of 4 strokes in 10 seconds. The rhythm of beat of the independent flagellum and the undulating membrane is more rapid. The clustered flagella arise from the secondary blepharoplast. From the primary blepharoplast arise the independent flagellum,

the marginal filament of the undulating membrane, the parabasal body, and the axostyle, and a rhizoplast connects it to the centrosome on the nuclear membrane.—*Harold Kirby.*

5134. KUNTZE, G. Das erste Auftreten von *Biddulphia sinensis* Grev. bei Helgoland. [The first appearance of *Biddulphia sinensis* in Helgoland.] Internat. Rev. Ges. Hydrobiol. u. Hydrograph. 11: 383–385. 1923.—The original location for this diatom was in the region of the Red Sea. Its migrations northwards are traced.—*N. Carter.*

5135. LOWE, CHARLES W. Freshwater algae and freshwater diatoms. Rept. Canadian Arctic Expedition 1913–18, 4: Pt. A. 53 p., 5 pl., 6 fig. 1923.—This is a study of the collections made by the southern party of the Canadian Arctic Expedition during 1913–16. It includes Myxophyceae, 28 species; Chlorophyceae, 137; Phaeophyceae and Rhodophyceae, 1 each, —a total of 167 species representing 60 genera. Notes on the occurrence and abundance of the various species are given and a tabular comparison with distribution in Alaska, U. S. A., Greenland, and the Faeroes. *Cosmarium Stefanssonii* n. sp., *Closterium didymococum* Corda var. *striatum* n. var., *Xanthidium cristatum* Breb. var. *bituberculatum* n. var., and *Staurastrum Holmii* n. comb. are figured and described. An annotated list of 29 genera and 87 species of freshwater diatoms is also given.—*Geo. D. Fuller.*

5136. NAUMANN, E. Die Hauptarbeiten der allgemeinen Limnologie schwedischer Gewässer seit 1911. [Chief work on aquatic biology of Swedish waters since 1911.] Internat. Rev. Ges. Hydrobiol. u. Hydrograph. 11: 352–365. 1923.—A review is presented of recent work.—*N. Carter.*

5137. NAUMANN, E. Über die jetzige Stellung der Limnologie in Schweden. [Present status of limnology in Sweden.] Internat. Rev. Ges. Hydrobiol. u. Hydrograph. 11: 173–178. 1923.

5138. OSTENFELD, O. *Biddulphia sinensis*. Internat. Rev. Ges. Hydrobiol. u. Hydrograph. 11: 564. 1923.—A note is contributed on the migration of the species.—*N. Carter.*

5139. PARDO, LUIS. Recherches sur la faune et la flore de l'Estany de Cullera dans la Province de Valencia (Espagne). [Research on the fauna and flora of the Estany de Cullera in the province of Valencia, Spain.] Ann. Biol. Lacustre 12: 93–101. 1923.—The plankton of this lake or expansion of the Corbera includes 10 species of diatoms and algae in addition to the zooplankton. The banks of the lagoon are partly vegetated with *Phragmites communis* and *Potamogeton pusillus*.—*N. Carter.*

5140. PASCHER, A. Die Süßwasserflora Deutschlands, Österreichs und der Schweiz. Heft 7: Chlorophyceae IV: Siphonocladiales, Siphonales. Bearbeitet von W. HEERING, Hamburg. [Freshwater flora of Germany, Austria and Switzerland. Part 7: Chlorophyceae IV: Siphonocladiales, Siphonales. Prepared by W. Heering.] 103 p., 94 fig. Gustav Fischer: Jena, 1921.—This treatise contains an account of the Siphonocladiales and Siphonales, prepared by the late W. Heering in 1912. It has descriptions, figures, and keys to the genera composing these 2 groups, together with appended bibliographies of the principal families. The genera, with the number of species in each, are as follows: *Chaetomorpha* 3, *Chaetonella* 1, *Rhizoclonium* 5 (with numerous subspecies), *Cladophora* 9, *Aegagropila* 7, *Pithophora* 2, *Sphaeroplea* 3, *Vaucheria* 21, *Vaucheriopsis* 1, *Dichotomosiphon* 1. In addition several varieties and species are mentioned with critical notes on their validity and synonymy.—*L. H. Tiffany.*

5141. PENARD, E. Quelques mots sur les micro-protistes. [A note on the micro-protists.] Ann. Biol. Lacustre 12: 5–10. 1923.—A method is described for recovering on the slide minute algae, protozoa, etc., from a mixture of coarse material; practical suggestions are made for examination.—*N. Carter.*

5142. ROBERT, HENRI. L'emploi du filet et de la pompe dans les pêches de plankton. [The use of net and pump in collecting plankton.] Ann. Biol. Lacustre 11: 209–239. 1922.—A description is given of the nets ordinarily used, such as the Fuhrmann, Apstein and Nansen nets, with calculations of the size of the meshes in various nets, and discussion of the particular net to be used in different cases. The effect of the speed of drawing up the net is also discussed. The Fuhrmann net is good for qualitative work, but the Nansen net should be used for quantitative studies. The net of mesh No. 20 is the one usually used for phytoplankton. The pump is far less efficient in plankton collecting than the net.—*N. Carter.*

5143. SCHMIDT, PAUL. *Morphologie und biologie der Melosira varians, mit einem Beitrag zur Microsporenfrage.* [Morphology and biology of *Melosira varians* with a contribution to the question of microspore production.] Internat. Rev. Ges. Hydrobiol. u. Hydrograph. 11: 114-147. Pl. 5-9. 1923.—The structure of the cell wall and cell-contents of the diatom is treated in some detail. There are about 10-30 chloroplasts, destitute of pyrenoids, the form and color of which depend on external conditions. The nucleus is very minute and difficult to find. Oil globules and other rounded bodies are present. The method of filament formation and the attachment of the cells end to end is also described. The temperature relations of the alga and its preference for running water with an abundance of oxygen are discussed. Growth is stimulated by a small amount of organic matter. It is found only temporarily in ponds in winter and spring, and occurs abundantly in streams in summer. Cell division and auxospore formation are described and also reproduction by biciliate microspores. Four ciliate spores were also observed which were presumably zygospores. Some parasites of *Melosira* are also described.—*N. Carter.*

5144. SCHODDUYN, RENE. *Materiaux pour servir à l'étude biologique des cours d'eau de la Flandre Française. La Haute Colme, Le Canal de Bergues et la Rommelaere.* [Biological study of the water courses of French Flanders.] Ann. Biol. Lacustre 12: 123-215. 1923.—The 3 bodies of water are treated separately. The physico-chemical relations of La Haute Colme and Le Canal de Bergues are treated in some detail. The 1st mentioned has a phanerogam flora of 23 species but its algal flora does not seem to be very rich, except for the diatoms. Le Canal De Bergues is brackish, and *Phargmites communis* lives without difficulty on its banks, but very few other phanerogams are present. Because of its brackish nature certain algae, such as *Enteromorpha*, *Cladophora*, and *Rhizoclonium*, thrive. The plankton collections from both these bodies of water are tabulated in full. Le Rommelaere was less thoroughly investigated.—*N. Carter.*

5145. STEINECKE, FR. *Die Algen des Pakledimmer Hochmoors.* [The algae of the Pakledimmer high moor (East Prussia).] Bot. Archiv 1: 225-229. 1922.—An extensive list, without descriptions, is given of all blue greens, flagellates, diatoms, and greens found.—*William Seifriz.*

5146. VAN OYE, PAUL. *Contribution à la connaissance de la flore et de la faune microscopiques des Indes Néerlandaises.* [Contribution to a knowledge of the microscopic flora and fauna of the Dutch East Indies.] Ann. Biol. Lacustre 11: 130-151. 1922.—A list is given of about 160 species of freshwater algae, also many flagellates and microscopic animals, from Java.—*N. Carter.*

5147. VOUK, V. *Die Probleme der Biologie der Thermen.* [Biology of hot springs.] Internat. Rev. Ges. Hydrobiol. u. Hydrograph. 11: 89-99. 1923.—Thermal algae live exclusively in hot water; thermophilous algae can exist either in hot or cold water. A system for classifying hot springs according to the temperature of the water is given. The composition of the algal growths varies according to the temperature, e.g., at 53-49°C. *Mastigocladus laminosus* and *Phormidium laminosum* will be present, but at lower temperatures other species occur. Animal life is not common in hot springs and above 35°C. only amoebae occur. The typical biological flora of hot springs consists of Cyanophyceae, although diatoms, desmids, Chlorophyceae, and the Characeae also occur. Bacteria are naturally present in the slime or ooze; and in sulphur springs, sulphur bacteria occur. Phanerogams are only very occasional inhabitants. The question is discussed whether the algae of hot springs have occupied this habitat since the beginning of the appearance of life on the earth or whether they have adapted themselves secondarily to these situations. Experimental evidence failed to give a conclusive answer. The phenomena of lime and silica deposition and the resistance of the protoplasm of the cells to coagulation are lightly touched on.—*N. Carter.*

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 4825, 4834, 4840, 4887, 5047, 5486, 5487, 5491, 5567, 5568)

5148. ANONYMOUS. Duplicate specimens for exchange. *Bryologist* 27: 20. 1924.—Three mosses from California, an hepatic from the same state, and 2 lichens from Florida are listed, with locality and collector data.—*E. B. Chamberlain*.

5149. ANDREWS, A. LeROY. *Hymenostomum in North America*. *Bryologist* 27: 1-3. 1924.—In this 3rd paper of the series [see Bot. Absts. 5, Entry 1917; 12, Entry 571] the author discusses *Astomum ludovicianum* Sull., making the new combination *Hymenostomum ludovicianum* (Sull.) Andrews. He regards it a fairly well-defined specific form, related to *H. Muhlenbergianum* and probably confined to southeastern U. S. A. He also discusses the North American range of *Hymenostomum microstomum* (Hedw.) R. Br., a species accidentally omitted from the Lesquereux & James Manual. The species has been found in Ohio (?), New Jersey, and Massachusetts. The author outlines the important differences between it and *Weisia viridula*, with which it may be confused.—*E. B. Chamberlain*.

5150. ANDREWS, A. LeROY, EDWARD B. CHAMBERLAIN, GEORGE B. KAISER, GEO. HALL CONKLIN, AND CHARLES C. PLITT. *Annual reports—Sullivant Moss Society—1923*. *Bryologist* 27: 15-19. 1924.—The reports include those of the President, the Secretary-Treasurer, and the Curators of the 3 herbaria maintained by the Society. In 1 report mention is made of the collection of *Jamesoniella heterostipa* Evans in Quebec.—*E. B. Chamberlain*.

5151. BARTRAM, EDWIN B. *Grimmia poecilostoma* Card. & Seb. in North America. *Bryologist* 27: 14, 15. 1924.—This species is rare and local in Europe, where there has been a tendency to consider it a hybrid. The present report of the species from Bernalillo County, New Mexico, and Pinal County, Arizona, is apparently the 1st extra-European record. The author notes that one of its putative parents does not occur in America and states that the logical position of the species would seem to be in the subgenus *Gasterogrimmia*.—*E. B. Chamberlain*.

5152. BARTRAM, EDWIN B. *Notes on Grimmia orbicularis* Bruch. *Bryologist* 27: 10. 1924.—The species is apparently a meridional type, ranging mainly from western Europe to Persia, though once reported from Mexico and once from the Straits of Magellan. It seems to be one of the characteristic species, however, of southern Arizona, and probably ranges south in the Sonoran Zone of Mexico.—*E. B. Chamberlain*.

5153. CHAMBERLAIN, EDWARD B. *Prof. Holzinger's Musci Acrocarpi Boreali-Americani*. *Bryologist* 27: 20. 1924.—This note lists the species of mosses that make up the 20th fascicle of Holzinger's *exsiccati*, with comment upon the large proportion of especially interesting forms present.—*Author*.

5154. COTTERAU, E., ET L. CORBIÈRE. *Muscinées des environs de Grasse (Alpes-Maritimes)*. [Bryophytes of the vicinity of Grasse.] *Bull. Soc. Bot. France* 69: 300-306. 1922.—The present report is based on a collection made in 1917 by Cotterau in the Department of the Alpes-Maritimes in southern France. The species listed, with data regarding localities, include 84 mosses and 13 hepatics, 4 of the mosses and 2 of the hepatics being recorded from the Department for the 1st time.—*A. W. Evans*.

5155. HOLZINGER, JOHN M., AND EDWIN B. BARTRAM. *The genus Crossidium in North America*. *Bryologist* 27: 3-9. Pl. 1-3, 1 fig.—In this, the concluding part of the present paper, the following are proposed as new and figured: *Crossidium aberrans*, based on Arizona specimens but known also from California, and *C. erosum* and *C. spatulaefolium*, both of Arizona. [See also Bot. Absts. 13, Entry 4370].—*E. B. Chamberlain*.

5156. MAHEU, JACQUES. *Régénération du Barbula muralis, après quatorze ans de sécheresse, par protonémas foliare primaire propagulifères et protonémas secondaires bulbigènes. [Regeneration of Barbula muralis after 14 years by means of primary foliar protonema bearing gemmae and secondary protonema with bulblets.] Bull. Soc. Bot. France* 69: 330-334. 9 fig. 1922.—The author redescibes his observations on the regeneration of *Barbula muralis* in material kept dry for 14 years. When placed in moist atmosphere short filaments bearing apical unicellular gemmae grew out from certain leaf cells. These gemmae gave rise to second-

ary protonemata with rhizoids, upon which minute bulblets appeared, developing directly into delicate leafy shoots. [See also Bot. Absts. 12, Entry 1942.]-A. W. Evans.

5157. MEDELIUS, SIGFRID. *En bryologisk utflykt till Halland.* [A bryological trip to Halland.] Svensk Bot. Tidskr. 16: 9-34. 1922.—A brief report is presented of a moss-collecting trip to the province of Halland, Sweden, including descriptive notes on the nature of the country and lists of the moss species found under different conditions; 278 species are reported, 75 being liverworts, 22 peat mosses, and 181 true mosses.—W. W. Gilbert.

5158. MELIN, ELIAS. *Sphagnum-floran i Bjurfors och Björnhyttans Kronoparker.* [The Sphagnum flora in the state-forests of Bjurfors and Björnhyttans.] Svensk Bot. Tidskr. 17: 108-110. 1923.—The 2 Swedish forests mentioned are in the districts of Västmanland and Dalecarlia, respectively. The author lists 31 species of *Sphagnum* from these forests with full data regarding stations.—A. W. Evans.

5159. MELIN, ELIAS. *Sphagnum molle* Sull. i Dalarne. [Sphagnum molle in Dalecarlia.] Svensk Bot. Tidskr. 17: 379-380. 1923.—The author notes the occurrence of the *Sphagnum* in the state forest of Björnhyttans, district of Dalecarlia, Sweden. He compares it with the recently described *S. angermanicum* Melin [see Bot. Absts. 5, Entry 626] and gives data regarding its distribution in other parts of Sweden and in Norway.—A. W. Evans.

5160. PRAEGER, W. E. A collection of *Sphagnum* from the Douglas Lake region, Cheboygan County, Michigan. Ann. Rept. Michigan Acad. Sci. 21: 237, 238. 1920.—The present report is based on a collection made by the author during the summer of 1918 and determined by A. LeRoy Andrews. The list includes 10 species and 2 varieties, a definite station being cited for each specimen.—A. W. Evans.

5161. THÉRIOT, I. *Le genre Mnium dans la Seine Maritime.* [The genus *Mnium* in the Seine Maritime.] Bull. Soc. Linn. Seine Maritime 1922: 229-234. 8 fig. 1922.—After a short account of the distinctive features of the genus *Mnium* and of its general distribution, the author gives a key for the determination of the 8 species known from the Seine Maritime, Normandy, France, and follows this by descriptions of the species with data on their local distribution. The figures accompanying the species illustrate single leaves and groups of leaf-cells.—A. W. Evans.

5162. THÉRIOT, I. *Mousses du Costa-Rica.* [Mosses of Costa Rica.] Recueil Publ. Soc. Havraise Études Diverses 88: 307-315. 8 fig. 1921.—The collection of mosses, which forms the basis of the present report, belongs to the Museum of Natural History at Paris and most of the specimens in it were collected by O. Jimenez and C. Wercklé. The author acknowledges the assistance of V. F. Brotherus in his study of the collection and enumerates 25 species, the following being proposed as new and figured: *Calypothecium turgescens*, *Erythrodontium subdensum*, *Leptotheca* (?) *costaricensis* Card. & Thér., *Macromitrium Werckleanum* Thér., *Meteorium undulifolium*, *Neckera Wercklei*, *Pogonatum confertidens*, and *Thuidium costaricense*. Unless otherwise noted Brotherus & Thériot are authorities for all new names. In connection with *Leptotheca costaricensis* the author proposes the division of the genus into the 2 sections *Euleptotheca* and *Leiocarpa* and intimates that the latter, which includes the Costa Rican species, may be worthy of generic rank. A few of the other species are accompanied by critical remarks.—A. W. Evans.

5163. THÉRIOT, I. *Reliquiae Delessertianae.* Recueil Publ. Soc. Havraise Études Diverses 88: 1-10. 1921.—The collection of mosses here reported upon was made by Bertero nearly a century ago in southern Chile and on the island of Juan Fernandez. After Delessert's death it became the property of the Conservatory of Botany at Geneva and was sent to Cardot for study. The present report is based largely on Cardot's work and enumerates 17 species and varieties from Chile and 8 from Juan Fernandez. The following, all from Juan Fernandez, are proposed as new, Cardot being the authority in each case: *Bartramia fernandeziana*, *Dicranum Menziesii* var. *fernandezianum*, *Hypnum Lechleri* var. *fernandezianum*, and *Rhacopilum fernandezianum*. The paper includes also a report on 22 Mexican mosses collected by Andrieux and Galeotti in 1833 and 1840, respectively. This collection, likewise belonging to the Conservatory of Geneva and investigated by Cardot, contains only 1 new species, *Mielichhoferia omissa* Card.—A. W. Evans.

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*D. S. WELCH, *Assistant Editor*

(See also in this issue Entries 4829, 4830, 4834, 4909, 4910, 5213, 5215, 5216, 5224, 5225, 5228, 5229, 5235, 5237, 5238, 5239, 5248, 5252, 5253, 5257, 5277, 5278, 5281, 5315, 5340, 5353, 5418, 5482, 5486, 54875491, 5567, 5568, 5605)

FUNGI

5164. ANONYMOUS. *Yorkshire Naturalists at Skipton*. *Naturalist* 1920: 183-188. 1920.—The report contains several species of fungi new to the Mid-West division of the county.—*W. H. Burrell*.

5165. ANONYMOUS. *Yorkshire Naturalists at South Cave*. *Naturalist* 1921: 213-216. 1921.—The report contains notes of flowering plants and fungi and records one fungus, *Anthostoma decipiens* (DC.) Nke., new to the county list.—*W. H. Burrell*.

5166. ARTHUR, J. C. *New species of Uredineae*. XV. *Bull. Torrey Bot. Club* 51: 51-59. 1924.—The following are included: *Coleosporium Spigeliae* n. sp., *C. aridum* Jackson n. sp., *Milesia Scolopendrii* (Fuckel) n. comb., *M. australis* n. name, *Chrysopsora Cestri* (Diet. & Henn.) n. comb., *C. Mikaniae* n. sp., *Diorchidium brasiliensis* n. sp., *Puccinia Lygodii* (Hariot) n. comb., *Dicaeoma Lygodii* (Hariot) n. comb., *Puccinia ecuadorensis* n. sp., *P. minuscula* n. sp., *Uromyces Standleyanus* n. sp., *Uromyces Betheli* n. sp., *Nigredo Suksdorfii* (Diet. & Holw.) n. comb., *N. verruculosa* (Schroet.) n. comb., and *Pucciniola Betheli* n. comb.—*P. A. Munz*.

5167. BURNIER ET LANGERON. *Épidermite dyshydrosiforme des pieds due à une levure*. [A disease of the foot caused by a yeast.] *Congrès des Dermatologistes et Syphiligraphes*, Paris, 1922 (1-2). *Masson & Cie.*: Paris, 1922.—*Cryptococcus Jeanselmei* is described as new.—*J. R. Schramm*.

5168. DEARNESS, JOHN. *Fungi*. *Rept. Canadian Arctic Expedition 1913-18* 4: Pt. C. 24 p. 1923.—This is an annotated list of 140 species of fungi collected on the Arctic coast of North America west of the 100th meridian. The following new species and varieties are given: *Mycosphaerella immersa*, *M. minor* var. *reticulata*, *Didymosphaeria Johansenii*, *Pleospora Drabae* var. *nuda*, *Dothidella sphaerelloides*, *Leptothyrium pulchrum*, *Leptostromella Drabae*, *Discosia acuta*, *Phoma Cerastii-maximi*, *Dendrophoma Lupini-arctici*, *Diplodia minor*, *Diplodia Calamagrostidis*, and *Septoria Ammodeniae*.—*Geo. D. Fuller*.

5169. DODGE, B. O. *A new type of orange-rust on blackberry*. *Jour. Agric. Res.* 25: 491-494. 1923.—Several wild blackberry plants in the vicinity of Washington, D. C., are reported as infected with an orange-rust which develops 2 kinds of aecidia, frequently side by side on the same leaf. The spores in each case are large, round, and dark reddish orange, i.e., of the type characteristic of spores of the long-cycled rust *Gymnoconia*. The spores from certain of these aecidia regularly produce promycelia on germination, whereas those from other aecidia produce only long germ tubes. The aecidiospores germinating like teleutospores are rather waxy, clinging together in the sorus, and are slightly darker colored than are the spores which produce germ tubes. Since the common short-cycled orange-rust has small, irregular, light yellowish-orange aecidiospores the author believes that the production of 2 kinds of aecidia in this case is not necessarily due to the fact that there are 2 mycelia from 2 distinct orange-rusts in these plants, but is more likely due to the presence of a very unstable strain of the long-cycled rust from which a new type of short-cycled rust is being evolved. Infection experiments to settle this question are under way.—*John W. Roberts*.

5170. GABRIEL, C. *Note sur l'innocuité de Volvaria gloiocephala* DC. [Harmlessness of *V. gloiocephala*.] *Compt. Rend. Soc. Biol.* 88: 187-188. 1923.—Although this mushroom has been reported as dangerous and even deadly, in the north-east of France and in the region around Marseilles it is quite harmless and has excellent culinary qualities. Its toxicity is hence in question.—*Oran Raber*.

5171. GÄUMANN, ERNST. *Mykologische Mitteilungen II.* [Mycological communications. II.] Bull. Jard. Bot. Buitenzorg 5: 1-11. Fig. 1-8. 1922.—The following are described as new, and figured: *Uromyces Ophiorrhizae*, *Puccinia tjibodensis*, *Phakopsora Commelinae*, *P. Erythrinae*, *Endophyllum Ixorae*, *Uromyces Phlogacanthi*, *Aecidium Phlogacanthi*, *Puccinia celebica*.—A. Rehder.

5172. HUBERT, ERNEST E. The red stain in the wood of boxelder. Jour. Agric. Res. 26: 447-458. 3 pl., 2 fig. 1923 [1924].—An account is given of the distribution, taxonomy, morphology, pathogenicity, and life history of a fungus, described here for the first time under the name *Fusarium Negundi* Sherbakoff, causing a characteristic bright carmine-red stain in the wood of *Acer Negundo*. The stain is common in the heartwood and is found to some extent in the sapwood, where the fungus may be weakly parasitic. The discoloration has been observed to extend from the roots to the smaller branches. The disease is common wherever boxelder is found and similarly discolored wood has been noted in Europe. The fungus grows well on artificial media such as malt, prune, oat, and potato agars and on these produces macroconidia, microconidia, and chlamydospores. A myxomycete often accompanies and was observed to feed upon the hyphae of the *Fusarium* isolated from the red-stained wood. The fungus enters the tree through wounds of various kinds, including broken branches and holes made in the bark and cambium by sapsuckers. These birds are factors in distributing the disease to other parts of the same tree or from tree to tree. Preventive measures are suggested.—Author.

5173. JØRSTAD, IVAR. Chytridineae, Ustilagineae and Uredineae from Novaya Zemlya. Rept. on the Scientific Results of the Norwegian Expedition to N. Z. 1921. No. 18. 12 p., 2 fig. Christiania, 1923.—Of the species found, 1 belongs to the Chytridineae, 6 to the Ustilagineae, and 7 to the Uredineae. Previously only 2 species were known from Nova Zembla. *Puccinia Lyngei* and *P. Nova-Zembliae* are described as new.—K. Münster Strøm.

5174. KAUFFMAN, C. H. The genus *Armillaria* in the United States and its relationships. Papers Michigan Acad. Sci. 2: 53-67. Pl. 5-9. 1923.—The author discusses the relationship of the genus *Armillaria* to the genera *Lepiota*, *Clitocybe*, *Tricholoma*, *Collybia*, and *Pleurotus*, among which some authors distribute its species. He decides it is better to retain the genus *Armillaria* although certain groups of species are perhaps more closely related to some of the above mentioned genera. A key is given to 30 species with a brief description of each. Some of the species are given a fuller description following the key. Seventeen species are listed as "exotic, excluded or doubtful."—Ernst A. Bessey.

5175. McDougall, W. B. Some fungi that are rare or have not been previously reported from Illinois. Trans. Illinois Acad. Sci. 12: 104-107. 10 fig. 1919.—The following species are recorded and figured: *Bulgaria inquinans*, *Leotia lubrica*, *Craterellus cornucopioides*, *Polyporus giganteus*, *P. robiniophilus*, *P. induratus*, *P. dryadeus*, *Entoloma grayanum*, *Stropharia saesifolia*, *Tricholoma rutilans*, and *Panus strigosus*.—Geo. D. Fuller.

5176. MATZ, JULIUS. The Rhizoctonias of Porto Rico. Jour. Porto Rico Dept. Agric. 51: 5-30. Pl. 1-28, fig. 2 A. 1921.—There are 2 distinct groups of Rhizoctonia. One comprises those species which inhabit and live on aerial parts, especially foliage of higher plants; whereas the other contains the root-infesting species. For purposes of classification, size and color of sclerotia and the nature of the colony are more satisfactory characters than size of mycelium. These characters are not always reliable unless the organism has been cultured under standard conditions. Nine species of Rhizoctonia are classified and described fully.—Geo. H. Dungan.

5177. MORRIS, H. E., AND GRACE B. NUTTING. Identification of certain species of *Fusarium* isolated from potato tubers in Montana. Jour. Agric. Res. 24: 339-364. 3 pl. 1923.—A record is given of taxonomic work carried on with 70 single spore isolations of *Fusarium* from potato tubers, suspected of being affected with dry rot or wilt, collected in Montana, between 1914 and 1918. The following species are technically described: *Fusarium oxysporum* Schlecht. var. *asclerotium* Sherb., *F. sclerotoides* Sherb. var. *brevius* Sherb., *F. trichothecioides* Wr., *F. subpallidum* var. *roseum* Sherb., *F. clavatum* Sherb., *F. discolor* Ap. & Wr. var. *sulphureum* (Schlecht.) Ap. & Wr., *F. culmorum* (W. Smith) Sacc., *F. Solani* (Mart. p. par.) Ap. & Wr., *F. coeruleum* (Lib.) Sacc. During the entire work there was no evidence that suggested an

ascigeral stage of any of these fungi. Comparative studies were made upon the following media: oat agar, lima-bean agar, potato-glucose agar, rice, potato plugs, sweet clover stems, and tomato stems. Oat agar, potato-glucose agar and rice proved most satisfactory for the study of such characters as color, amount and nature of the growth of mycelium, absence and presence of pseudopionnotes or sporodochia, and normal spore production. The limited use of steamed tomato stems indicated that these might be useful for spore production when dealing with "stubborn" cultures. A study was made of the production and normality of spores in cultures of different ages, the results indicating that this function varies with both media and age of the culture, so that only relative age is a factor as very young cultures or old cultures are not satisfactory for study. Light in general has no appreciable effect upon growth, except that color was more pronounced in the cultures grown in diffuse light. Photomicrographs were extensively used for studying spore characteristics and proved highly satisfactory. A brief review of the literature is given, and emphasis is laid upon the fact that a standard method should be adopted in describing fungi, so that data of different investigators might be comparable, as without uniformity of methods comparisons of data are practically impossible.—*H. E. Morris.*

5178. OVEREEM, C. VAN. Beiträge zur Pilzflora von Niederländisch-Indien. [Contributions to the fungus flora of the Dutch East Indies.] Bull. Jard. Bot. Buitenzorg 5: 247-293. 6 fig. 1923.—The author gives detailed descriptions, partly illustrated, and critical notes on a number of Malaysian fungi. Besides a synopsis of Clavariaceae of Java with a key to the species, remarks on fungi described by Rumphius and the new species enumerated below, there are notes on *Chondromyces aurantiacus* Thaxt., *Calocera*, and *Spegazzinia*. The following species, combinations, and genus are described as new: *Nectriella Geoglossi*, *Physalospora Baccaureae*, *Clavulina Leveillei* (Sacc.), *C. fusco-lilacina* (Berk.), *C. umbrina* (Lév.), *Clavaria luteo-tenerrima*, *C. depokensis*, *C. sanguineoacuta*, *Clavariella fragillima* (Hennings), *Phaeoclavulina Zippelii* (Lév.), *Clavulinopsis* n. gen., *C. sulcata*, *Geotrichum Zingiberis saccharati*, *Clasterosporium Glomeratae*.—*A. Rehder.*

5179. PALM, BJÖRN. Nya lokaler för parasit svampar från Stockholmstrakten. [New localities for parasitic fungi in the neighborhood of Stockholm.] Svensk Bot. Tidskr. 17: 379. 1923.

5180. POLLACCI, GINO. Miceti del corpo umano e degli animali. Nota 1a. [Fungi of man and animals.] Atti Ist. Bot. Univ. Pavia 18: 123-131. Pl. 30-31. 1921.—The following new forms isolated from man are described: *Haplographium De Bella Marengo* from a cutaneous lesion (*Penicillium crustaceum* (Link) Fries was found in the same lesion but experiments proved it non pathogenic); *Acromoniella Berti* and *Penicillium Burci* from a granulomatous tumor; *Torula Pais* from the arm pit.—*P. D. Caldis.*

5181. RICE, MABEL A. Internal sori of *Puccinia Sorghi*. Bull. Torrey Bot. Club 51: 37-50. Fig. 1-4. 1924.—A list is given of references to internal sori in various species of rusts. Instances are given of the occurrence of internal uredo- and teleuto-sori in *Puccinia Sorghi* on corn. These occurred in leaf, leaf-sheath, stem, and an abnormal branching ear. All these internal sori in corn underlay external sori.—*P. A. Munz.*

5182. SARMAN, PHILIP, AND F. L. STEVENS. The genus *Septoria*, presented in tabulation with discussion. Trans. Illinois Acad. Sci. 13: 176-219. 1920.—A tabulation is given of all species described in Saccardo's *Sylloge Fungorum*, Vols. 1-22. The table is designed to aid the student in quickly locating the description of any *Septoria* under observation. The table is arranged so as to indicate the following points: Volume number, species number, diameter of pycnidium, length and diameter of spores, number of septa and guttulae, spores straight or curved, color of spore, shape of spore, host genus, family number and locality. Notes are given on the relation of species to host plants and on the characters of the genus. Nearly 700 species fall within the limits of 20-50 μ for spore length. Twice such variation in spore length within a single species is not unusual. It would seem that a more careful study of the group would result in combining many existing species.—*H. W. Anderson.*

5183. SARTORY, A., PETGÈS, ET CLAQUÉ. Laryngite chronique pseudo-tuberculeuse d'origine mycosique due à une levure nouvelle, *Cryptococcus laryngitidis* n. sp. [A chronic pseudo-tubercular laryngitis due to a new yeast, *Cryptococcus laryngitidis*.] Compt. Rend.

Soc. Biol. 89: 179-180. 1923.—The symptoms, cultural characters, and treatment are given.
—Oran Raber.

5184. SAWADA, KANEYOSHI. *Taiwansan-Kinrui Chôshôhokoku Dai Ippen*. [Descriptive catalogue of the Formosan fungi. Part I.] Government of Formosa Agric. Exp. Sta. Special Bull. 19. 695 p., 14 pl. 1919. [In Japanese with 40 pages of fungus and host names in Latin.] —Investigation in the fields of mycology and plant pathology has been carried on at the Formosa Agricultural Experiment Station since 1904. This account includes the author's observations since 1908. In the bulletin 268 species in 116 genera and 39 families are reported. The genus *Uncinulopsis* based on *U. subspiralis* (Salm.) Sawada and the following 95 species and varieties are described as new, the authority, unless otherwise mentioned, being Sawada: *Pseudolpidium stellatum*, *Phytophthora Allii*, *P. Melongenae*, *Nozemia Lepironiae*, *Plasmodium Vernoniae-chinensis*, *P. Willemaniana* P. Henn. var. *macrospora*, *Bremia elliptica*, *B. microspora*, *B. ovata*, *B. Saussureae*, *B. Sonchi*, *Peronospora Chenopodii-ficifolii*, *Rhizopus chinensis* Saito. var. *rugosporus* Nakaz., *R. formosensis* Nakaz., *R. oligosporus* Saito var. *glaber* Nakaz., *Schizosaccharomyces formosensis* Nakaz., *S. formosensis* Nakaz. var. *akoensis* Nakaz., *S. formosensis* Nakaz. var. *tapaniensis* Nakaz., *S. hokkoensis* Nakaz., *S. Pinan* Nakaz., *S. santawensis* Nakaz., *S. Taito* Nakaz., *Aspergillus aureus* Nakaz., *A. Awamori* Nakaz., *Erysiphe Cinnamomi*, *Uncinulopsis subspiralis* (Salm.), *Zukalia nantoensis*, *Z. Theae*, *Scorias capitata*, *Cryptomyces Theae*, *Sclerotinia Allii*, *Torrubiella brunneola*, *T. Psyllae*, *Lisea Fujikuroi*, *Ophionectria tetraspora* Miyab. & Saw., *Ustilagoidea Sacchari-narengae*, *Phyllachora Fici-Wightianae*, *Mycosphaerella moricola*, *Leptosphaerulina moricola*, *Pleomassaria Agaves*, *Ustilago formosana*, *Cronartium Sawadae* Syd., *Phakopsora Pachyrhizi* Syd., *P. formosana* Syd., *Schroeteriaster Glochidii* Syd., *Uromyces hyalosporus*, *U. Kawakamii* Syd., *Puccinia Smilacinae* Syd., *Dicoidium Lophatheri* Syd., *Kuehneola Rosae*, *Phragmidium Rubi-fraxinifolii* Syd., *Coleosporium Arundinae* Syd., *C. Knorriae* Syd., *Uredo Fagariae* Syd., *U. morifolia*, *U. Scolopiae* Syd., *Helicobasidium cinereum*, *Septobasidium Acariae*, *Exobasidium Machili*, *E. reticulatum* Ito. & Saw., *E. Sawadae* Yamada, *Hypochnus Cinnamomi*, *Poria xylyna* Yasuda, *Polystictus formosae* Yasuda, *Phyllosticta Corchori*, *P. Glochidionis* Saw., *Phoma Jasminisambactis*, *Macrophoma Corchori*, *Neottiospora Theae*, *Ascochyta morifolia*, *Aschersonia Kawakamii*, *A. Suzukii* Miy. & Saw., *Colletotrichum Boehmeriae*, *Pestalozzia Kawakamii*, *P. Theae*, *Botrytis Liliorum* Fujik., *Cephalosporium zonatum*, *Spicaria Araneae*, *Dactylaria Costi*, *D. Leersiae*, *D. Panicipaludosi*, *Cladosporium Colocasiae*, *Helminthosporium Bryophylli*, *H. Papaveris*, *H. Setariae*, *Cercospora Corchori*, *C. Cyperi*, *C. Erodiae* Syd., *C. Glochidionis*, *C. piricola*, *Gibellula formosana*, *Tubercularia phyllophila* Syd., *Microcera Fujikuroi* Miy. & Saw., *Cerebella Panici-violascentis*.—Hideo Komuro.

5185. TOKUGAWA, YOSHICHIKA, AND YOSHIKADZU EMOTO. *Dai kwasai go hasseiseru aru Sijôkin ni tuite*. [Concerning a fungus which appeared immediately following the earthquake-fire.] Bot. Mag. Tôkyô 37: 185-193. 1 pl. 1923.—A fungus of red-orange color occurred everywhere on burnt trees and other objects immediately after the fire which followed the earthquake of Sept. 1 in Tôkyô and its vicinity. The authors regard the fungus as closely related to *Monilia aurea* (Link) Gmel or *M. aureofulva* C. & E. They discuss the form, giving the size and other characters of the hyphae, conidia and sclerotia. The fungus is killed by steam at 100°C. but endures dry heat up to 130°C.—Hideo Komuro.

5186. WELLES, COLIN G. Observations on taxonomic factors used in the genus *Cercospora*. Science 59: 216-218. 1924.—In this genus small morphological differences and host reactions are of little value as taxonomic criteria. Physiological behavior on artificial media and extent of parasitism are reliable criteria.—C. J. Lyon.

5187. WERDERMANN, E. *Einige neue Pilze aus Natal*. [Some new fungi from Natal.] Repertorium Speciarum novarum regni vegetabilis 19: 49-54. 1 pl. 1923.—The following new names are applied: *Asterina Pavoniae* n. sp. on leaves of *Pavonia* sp.; *A. vanderBijli* n. sp. on leaves of *Heteropyxis* sp.; *Parenaglerula MacOwaniana* var. *Elaeodendri* n. var. on leaves of *Elaeodendron Kroussianum*; *Haplodothella chaenostoma* (Sacc.) Werd., representing a new genus, on leaves of *Maesa rufescens*; *Uromyces Romouleae* v. d. Bijl. & Werd. n. sp.—P. A. van der Bijl.

LICHENS

5188. LYNGE, B. *Lavslegten Parmelia i Danmark*. [Parmelia in Denmark.] Bot. Tidsskr. 38: 69-78. 1923.—From herbarium material Lynge endeavors to classify the different species of *Parmelia*. He presents a key for their separation.—A. L. Bakke.

5189. MALME, GUST. O. *Lichenologiska notiser*. 27-34. [Lichenological notes.] Svensk Bot. Tidskr. 17: 369-375. 1923.—*Maronea constans* (Nyl.) Th. Fr., *Parmelia caperata* Ach., *Caloplaca lactea* (Mass.) Lettau, and *Catillaria premnea* (Fr.) Koerb. are reported. *Lecanora badia* (Pers.) Ach. has been found on the bark of *Pinus silvestris*. *Buellia farinosa* is described as new and notes are made on *Pertusaria lactea* (L.) Nyl., *Rhizocarpon Copelandi* Th. Fr., and *R. hyperboreum* Wainio.—O. Heilborn.

5190. MAMELI, EVA. *Note critiche ad alcune moderne teorie sulla natura del consorzio lichenico*. [Critical notes on some modern theories concerning the nature of the "lichenic" association.] Atti Ist. Bot. Univ. Pavia 17: 209-226. Pl. 20. 1920.—The author discusses critically the theories of Pierce, Nilson and Danilov who support Schwendener in the theory of parasitism; Elenkin's theory of endosaprophytism; and the theory of genetic relationship of Elfving and Minks. The arguments of Nilson in favor of parasitism are discussed critically in great detail. Researches mostly on fresh material, show no haustoria observed in *Placynthium corallinoides* (Hoffm.) Jatta, *Collema cristatum* (Lgthf.) Jatta, *C. granosum* (Wlf.) Jatta, *C. melaenum* Ach., *Leptogium dedalaeum* Fw., *Usnea dasypoga* Nyl., *U. florida* Hoffm., *Evernia prunastri* Ach., *Ramalina farinacea* Ach., *Nephromium laevigatum* (Smrf.) Nyl., *Peltigera canina* (L.) Hoffm., *Peltidea aphthosa* (L.) Ach., *Lobarina scrobiculata* (Scop.) Nyl., *Stictina sylvatica* Nyl., *S. limbata* Nyl., *Parmelia saxatilis* (L.) Ach. var. *sulcata* (Tayl.) Nyl., *Physcia obscura* Fr. var. *virella* (Ach.) Th. Fr., *P. stellaris* (L.) Fr. var. *ambigua* Schaer. *Pannaria coeruleo-badia* Mass., *P. rubiginosa* (Thmb.) Nyl., *Lecanora calcarea* (L.) Smrf., *Stereocaulon alpinum* Laur., *Cladonia rangiferina* (L.) Hoffm., *C. digitata* L., *Biatorella resinae* Fr.—Extremely rare cases of penetration of hyphae into gonidia were observed in *Xanthoria parietina* Fr., *Evernia furfuracea* Fr., *Haematomma ventosum* Fr.—Frequent cases of penetration were observed in *Anema Notarisii* (Mass.) Zahlbr., *Omphalaria pulvinata* Nyl., *Synalissa symphorea* (DC.) Nyl., *Physma cyathodes* Zahl.—No dead gonidia were found in *Lecanora atra* Hds., *L. calcarea* L., *L. alpina* Smrf., *Urceolaria ocellata* Vill., *Endocarpon minutum* (Ach.) Fr. var. *papillosum* Anzi., *Placynthium corallinoides* (Hoffmann) Jatta, *Collema cristatum* (Lgthf.) Jatta, *C. melaenum* Ach., *C. granosum* (Wlf.) Jatta., *Anema Notarisii* (Mass.) Zahlbr., *Omphalaria pulvinata* Nyl., *Synalissa symphorea* (DC.) Nyl., *Physma cyathodes* Zahlbr., *Peltigera canina* (L.) Hoffm., *Nephromium laevigatum* (Smrf.) Nyl., *Lobarina scrobiculata* (Scop.) Nyl., *Stictina sylvatica* Nyl., *S. limbata* Nyl., *Pannaria coeruleo-badia* Mass., *P. rubiginosa* (Thunb.) Nyl.—Dead gonidia were observed in *Xanthoria parietina* Fr., *Physcia obscura* Fr. var. *virella* (Ach.) Th. Fr., and *Haematomma ventosum* Fr.—*Evernia furfuracea* Fr., *Physcia pulvurulenta* Schreb., *Arthonia vulgaris* Schaer., var. *radiata* (Pers.) Krb., *Epheba pubescens* Fr., *Peltidea aphthosa* Ach. (*cephaloti*), *Peltigera canina* L. and the species mentioned previously were examined for genetic relationship of gonidium and hypha. No such relationship was found. The observations of Elfving are attributed to artifacts.—The author concludes that the presence of haustoria inside the gonidia is neither general nor constant in lichens. Furthermore the "dead zone" of Elenkin, although confirmed, is mostly sporadic, and where it is not so death of the gonidia is attributed to lack of light. In the homoimerous lichens the dead gonidia correspond to the heterocysts of the Cyanophyceae. In view of her experiments the author believes in the symbiotic nature of the lichenic association.—P. D. Caldis.

5191. DU RIETZ, G. EINAR. *Lichenologiska Fragment*. IV. *Några i Sverige Föga Beaktade Cladonia-Arter*. [Species of *Cladonia* seldom seen in Sweden.] Svensk Bot. Tidskr. 16: 69-76. 1922.—Brief notes are given on the distribution of *C. Delessertii* (Nyl.) Wain. *C. symphyrcarpia* (Floerk.) Arn., and *C. bacilliformis* (Nyl.) Lång., and their occurrence in Sweden.—W. W. Gilbert.

BACTERIA

5192. BACHMANN, A., ET J. M. MIRAVENT. Classification des Pneumocoques isolés en Argentine. [Classification of the Pneumococci isolated in Argentina.] Compt. Rend. Soc. Biol. 88: 385-386. 1923.—A classification based primarily on agglutination tests is given.—*Oran Raber*.

5193. BACHMANN, A., ET R. QUIROGA. Classification des Méningocoques isolés en Argentine. [Classification of the Meningococci isolated in Argentina.] Compt. Rend. Soc. Biol. 88: 364-365. 1923.—A classification based upon agglutination and other physiological reactions is presented.—*Oran Raber*.

5194. CAZENAVE, ED. Etude bactériologique et expérimentale du Streptocoque de l'impetigo contagiosa de T. Fox. [Bacteriological and experimental study of the Streptococcus of contagious impetigo of Fox.] Compt. Rend. Soc. Biol. 88: 703-704. 1923.—The bacteriological characters of *Mesentericus vulgaris* are given; also its relation to contagious ringworm of Fox.—*Oran Raber*.

5195. COSTA, S., ET L. BOYER. Sur un Microcoque isolé du sang au cours d'un deuxième cas d'endocardite infectieuse a forme prolongée. [A Micrococcus isolated from the blood during a second case of prolonged infectious endocarditis.] Compt. Rend. Soc. Biol. 88: 493-494. 1923.

5196. GERNEZ, CH., ET A. DUTHOIT. Les réactions biologiques dans la classification des *Bacterium coli*. [Biological reactions in the classification of *B. coli*.] Compt. Rend. Soc. Biol. 88: 527-529. 1923.—The biological reactions of *B. coli* are given with especial reference to antibodies.—*Oran Raber*.

5197. GHEORGHIU, I. Sur quelques cas de septicémie a *Diplococcus crassus*. [Some cases of septicemia caused by *D. crassus*.] Compt. Rend. Soc. Biol. 88: 535-536. 1923.—A 3-months' epidemic which attacked people of all ages is described. The causative organism seems to be *Diplococcus crassus*, the only difference observable being the presence of rather numerous Gram negative elements.—*Oran Raber*.

5198. GORY, M. Transformation muqueuse du *Bacillus coli*. [Mucous transformation of *B. coli*.] Compt. Rend. Soc. Biol. 88: 49-51. 1923.—Filtered sewage water produces both macroscopic and microscopic changes in *B. coli*. The cultures become more viscous and mucoid and the indol reaction is reduced. The forms so induced are much more like Friedlander's *Bacillus*. The prospects are good for an entire series connecting *B. coli* with the Friedlander form. This may explain why the latter type is found more commonly in contaminated waters where *B. coli* is expected.—*Oran Raber*.

5199. KIRCHENSTEINS, AUG. Sur la morphologie et le mode de développement des formes atypiques des Bactéries. [Morphology and mode of development of atypical forms of bacteria.] Compt. Rend. Soc. Biol. 88: 716-717. 1923.—Variations of Micrococci, Bacilli, and Vibrios are produced in unfavorable growth conditions. These variations follow a given course under the same set of conditions and can not therefore be considered as abnormal. In fresh nutrient media they return to the original form. These variations are considered as atavistic forms and the elongated and branched forms lead to the conclusion that the bacteria have been derived from the molds.—*Oran Raber*.

5200. VAN SACEGHEM, RÉNÉ. Pleuropneumonie des Bovidés, due à un nouveau Bacille. [Pleuropneumonia of the Bovidae due to a new Bacillus.] Compt. Rend. Soc. Biol. 89: 446-448. 1923.—A new bacterium is described of the genus *Coccobacillus* causing pleuropneumonia of cattle in East Africa. The form is very minute with rounded ends, non-motile, Gram-negative. The cultural characters are also given.—*Oran Raber*.

5201. W[AKSMAN], S. A. [Rev. of: ISSATCHENKO, B. L. Russian title. (Investigations on the bacteria of the Arctic ocean.) 300 p. Petrograd, 1914.] Absts. Bact. 7: 275. 1923.

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD W. BERRY, *Editor*

(See also in this issue Entries 4863, 4868, 4895, 4902, 4903, 4904, 4906, 5494)

5202. BERRY, EDWARD W. A cucurbitaceous fruit from the Tertiary of Texas. *Torreya* 24: 5-7. *Fig. 1-2*. 1924.—*Calycophysoides balli* n. gen. and sp. is described, based on a large fossil fruit from an outcrop of unconsolidated Tertiary in Foard County, Texas. The genus resembles the modern South American *Calycophyllum*.—*J. C. Nelson*.

5203. BERRY, EDWARD W. An early Eocene florule from central Texas. U. S. Geol. Surv. Professional Paper 132. 87-92. *Pl. 23, fig. 8*. 1924.—The author describes a small florule of 12 species from the lower Eocene of Bastrop County, Texas. The genera represented are *Pourouma*, *Laurus*, *Asimina*, *Terminalia*, *Asplenium*, *Viburnum*, *Mespilodaphne*, *Rhamnus*, *Ficus*, and *Sapindus* (?). *Mespilodaphne precoushatta* is described as new. The age is pre-Wilcox or early Wilcox.—*E. W. Berry*.

5204. BERRY, EDWARD W. Fossil plants from the Eastern Andes of Colombia. Bull. Torrey Bot. Club 51: 61-67. *Fig. 1-25*. 1924.—*Simaruba versicoloroides* (Simarubaceae), *Saccoglottis cipaconensis*, (Humiriaceae), and *Cordia vera* (Boraginaceae) are described as new species, being based on fossil fruits.—*P. A. Munz*.

5205. BERRY, E. W. Paleobotany at the New York State Museum. *Science* 59: 336-337. 1924.—The author reviews the paleobotanical work of this institution on the Devonian flora of New York State, with special reference to the description and restoration of *Eospermatopteris*.—*Author*.

5206. BUGNON, P. L'origine phylogénétique des plantes vasculaires d'après Lignier et la nouvelle classe des Psilophytales. [The phylogeny of vascular plants according to Lignier and the new class Psilophytales.] Bull. Soc. Linn. Normandie VII, 4: 196-212. 1921 [1922].—The author discusses Lignier's views of the phylogeny of vascular plants in the light of the recent discoveries of Kidston & Lang, and concedes the possibility of a group of plants in which stem, branches and leaves were not yet differentiated but in which a vascular system was partly developed, standing in an ancestral relationship to the sporophytes. Such a group is called the Thalloxylophytes.—*M. Denis*.

5207. CARPENTIER, A. Révision de la feuille de Rocroi au 80000 e. [Revision of the Rocroi sheet on the scale of 1:80,000.] Bull. Carte Geol. France 26: 1-4. 1923.—The author comments on and lists the fossil plants from the Wealden (Lower Cretaceous) found in the area of the map, which is one of the standard sheets of the geological map of France.—*E. W. Berry*.

5208. CARPENTIER, A. Revue des travaux de paléontologie végétale 1910-1919, II. Mésozoïque (Trias-Wealden). [Review of contributions to paleobotany 1910-1919, II. Mesozoic, Triassic to Wealden.] Rev. Gén. Bot. 35: 254-348. 1923.—This is a review of the older Mesozoic literature of paleobotany that appeared during the decade 1910-1919.—*E. W. Berry*.

5209. COCKERELL, T. D. A. A genuine fossil *Ophioglossum*. *Torreya* 24: 10-11. *1 fig.* 1924.—*Ophioglossum hastatifforme* n. sp. is described, based on 2 specimens found in the Wind River or Bridger formation of the Eocene Tertiary at Tipperary, Wyoming.—*J. C. Nelson*.

5210. GOTHAN, W. Leitfossilien, Pt. 3. Karbon und Perm-Pflanzen. Index fossils. Carboniferous and Permian plants.] 187 p., 45 pl., 144 fig. In: GURICH, G. Leitfossilien. Gebrüder Borntraeger: Berlin, 1923.—Part 3 of this work is devoted entirely to fossil plants, and discusses their occurrence in the older Paleozoic as well as at the horizons named in the title.—*E. W. Berry*.

5211. KUBART, B. Einiges über unsere Braunkohle. [Note on our brown-coal.] Braun-kohle 34. 2 p., 1 fig. 1923.—According to the author the characteristic wood of the central European Tertiary brown-coal is that of the Sequoia, and not that of Taxodium as has been so generally supposed.—*E. W. Berry*.

5212. NOÉ, A. C. The flora of the western Kentucky coal field. Kentucky Geol. Surv. VI, 10: 127-148. *24 fig.* 1923.—A popular illustrated account is given of the Carboniferous flora found in the coal measures, chiefly around Princeton, in western Kentucky.—*E. W. Berry*.

5213. POSTHUMUS, O. A contribution to the knowledge of the relation between Psilophyton and Rhynia. Rec. Trav. Bot. Neerland. 20: 313-320. *4 fig.* 1923.—The author de-

scribes the cuticle and supposed stomata in a specimen of *Psilophyton* from Canada which contained the fungus *Palaeomyces agglomerans*. He also describes the cuticle of a specimen of *Rhynia* from the Devonian of Scotland as seen in thin sections, pointing out the great similarity between *Psilophyton* and *Rhynia*, even to their infection by the same fungus, thus verifying the conclusions of other students regarding the close affinity between these 2 Devonian genera.—*E. W. Berry*.

5214. SEWARD, A. C. [Rev. of: KIDSTON, R. Fossil plants of the Carboniferous rocks of Great Britain. Mem. Geol. Surv. Palaeont. 2: 1-375. 91 pl. 1923.] Geol. Mag. 61: 35-37. 1924.

PATHOLOGY

FREDERICK V. RAND, *Editor*

LILLIAN C. CASH AND HARRY BRAUN, *Assistant Editors*

(See also in this issue Entries 4769, 4770, 4773, 4782, 4794, 4795, 4798, 4809, 4814, 4833, 4834, 4887, 4935, 4958, 5004, 5055, 5059, 5060, 5068, 5083, 5086, 5116, 5123, 5166, 5168, 5169, 5172, 5173, 5176, 5177, 5179, 5181, 5182, 5184, 5186, 5190, 5419, 5449, 5456, 5457, 5458, 5483, 5522, 5567, 5569)

DISEASES CAUSED BY FUNGI

5215. ALLEN, RUTH F. Cytological studies of infection of Baart, Kanred, and Mindum wheats by *Puccinia graminis tritici* Forms III and XIX. Jour. Agric. Res. 26: 571-604. 7 pl. 1923 [1924].—Baart wheat is susceptible to specialized forms or races III and XIX of *Puccinia graminis tritici* Erikss. and Henn.; Kanred is susceptible to III and immune from XIX; and Mindum is immune from III and slightly resistant to XIX. The germ tube of the urediniospore forms an appressorium over the stoma before entering the host. Appressoria of both races of rust secrete some substance which softens the guard cell walls and sometimes kills the cell contents. Its action, which seems to be quite independent of susceptibility and immunity, is weakest on stomata of Baart, is intermediate on Kanred, and strongest on Mindum. The percentage that succeeds in entering the host ranges from 5 to 18 in Kanred, and from 23 to 78 in Baart and Mindum. Race III develops normally and produces uredinia in Baart and Mindum. Where the mycelium is densest, the host cells are stimulated to increased metabolic activity that meets the needs of the fungus. The nuclei increase greatly in volume. The plastids decrease in size at first but this reduction is soon checked. In the outlying regions of the infection the stimulus comes later and is weaker. Plastids here are reduced further than at the center, but later the nuclei expand somewhat and the plastids partly recover. Still later, the oversized host nuclei throughout the infected area collapse. Race III on Mindum may die after 2-3 days or may continue a meager growth for 2 weeks. When the young fungus forms a haustorium in a mesophyll cell, the living contents of that cell condense around it and die. Haustoria in epidermal tissue expand and function for a time. Older fungi elicit less violent reactions in the host, but haustoria become enveloped in a heavy sheath and soon die. No spores are produced. Host tissues beyond the fungus are plasmolyzed and an occasional cell wall is greatly swollen. The secretions of race III that stimulate the cells of Baart and Kanred kill the cells of Mindum.—*Author*.

5216. D'ANGREMOND, A. Bestrijding van Veldschimmel (*Oidium spec.*) in de Vorstenlanden. [Control of tobacco mildew in the Vorstenlanden district.] Mededeel. Proefsta. Vorstenland. Tabak. 49. 7-25. 1 pl. 1923. [With English summary].—The life history of tobacco mildew and the manner of infection in the field year after year are not known. *Oidium* can not be grown on artificial media but only on living tobacco plants under high moisture conditions. No perithecia have been found in this fungus and so it is not certain whether it is the same organism found in Portugal and Italy and described by Jensen as *Erysiphe lamprocarpa*.—Extremely moist conditions are most favorable for the growth of the fungus. The mycelial growth first shows itself on the under side of the leaf in a few

isolated patches. Then follows the profuse appearance of mycelium on the upper surface. The greatest infection occurs toward the end of October when 90% of the leaves may be infected. Infection for the total crop varies from 3 to 4% but the most desirable leaves show from 13 to 18%. Dusting the plants with sulphur controlled the fungus but in curing, particles of sulphur were found to adhere to the leaves, which ruled out that method. Bordeaux mixture proved ineffective. Lime-sulphur gave a higher percentage of uninfected plants but leaf injury occurred.—The effective control measure evolved was to spread powdered sulphur between the rows at the rate of 500 kgm. per hectare.—*Cecil Yampolsky*.

5217. ATANASOFF, D. **The Fusarium disease of cereals.** Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 32-33. H. Veenman & Sons: Wageningen, 1923.—Various diseases of cereal crops, including seedling-blight, snow-mold, foot-rot, and head-blight are caused by several species of *Fusarium* which may differ in different countries. In northern Russia *F. avenaceum* is the most important; in Holland, *F. culmorum*.—*F. Weiss*.

5218. BARTHOLOMEW, LUCILLE K., AND EDITH SEYMOUR JONES. **Relation of certain soil factors to the infection of oats by loose smut.** Jour. Agric. Res. 24: 569-575. 2 fig. 1923.—An attempt was made to analyze the effects of certain soil factors—e.g., moisture, temperature, composition, and acid or basic reaction—upon the fungus, *Ustilago Avenae* (Pers.) Jens., upon the host, *Avena nuda* L., and upon the 2 in combination. Soil temperatures were regulated by the use of temperature tanks and soil moistures were computed and maintained in terms of the saturation point of the soil.—The temperature ranges for growth of the fungus on potato dextrose agar, for the germination of the spores in beef broth, for sporidial production in beef broth, and for germination of the seed of *Avena nuda* were determined.—High soil temperatures were accompanied by a marked reduction in the percentages of infection under the conditions of the experiment. Low soil temperatures also were accompanied by a reduction in the percentages of infection but to a much less degree than in the case of high temperatures. High soil moistures combined with high soil temperatures resulted in complete elimination of the fungus, whereas low soil moistures, within a certain temperature range, were accompanied by relatively high percentages of infection.—Conditions of high moisture combined with low temperatures in the spring of the year at the time of sowing oats would tend, undoubtedly, to reduce infection. Field observations show that the sowing of oats early in the spring apparently tends to reduce the amount of infection by loose smut; on the other hand, fall sowing, while the temperature is high, tends also to cut down infection.—*L. K. Bartholomew*.

5219. BARTLETT, H. **The control of take-all and foot-rot in wheat.** Agric. Gaz. New South Wales 35: 82. 1924.—These diseases caused much damage in a crop on comparatively new soil. The method used consisted of fallowing and also growing an alternate crop. No control field was used. The method was considered successful.—*L. R. Waldron*.

5220. BATCHELOR, L. D. **Methods of harvesting and irrigation in relation to moldy walnuts.** California Agric. Exp. Sta. Bull. 367. 677-696. 2 pl. 1923.—Nuts mold readily on the trees at any time after the husks start to crack, the mold starting its growth on the damp lining of the husk and finally spreading to the kernel. The most prevalent fungus is *Alternaria*. The mold makes nearly all its growth while the kernels are still very moist. The first drying out at the beginning of the curing process checks further development. The percentage of moldy nuts increases rapidly if the harvesting operations are delayed, especially if the nuts are still in the husks, even though they are partly cracked open and still on the trees. The percentage of moldy nuts and the increase of mold as the harvest season advances are greater in stick-tights than in clean nuts. The increase in percentage of mold among nuts left in the orchard is much greater in green and mushy stick-tights than in black, dry stick-tights, since the latter dry up and partly cure while still on the trees. The percentage of the crop which falls as green or mushy stick-tights is much greater in groves which are not adequately irrigated during the close of the growing season. Detailed recommendations are made for controlling moldiness. The mold in walnuts is usually present before they reach the curing trays. Under reasonably good methods of handling the nuts on the trays, the mold does not increase during the curing process.—*A. R. C. Haas*.

5221. BAUDYŠ, E. *Hygiēna bramborů*. [Potato hygiene.] Moravský Hospodář [vol. ? 42-43, 52-53, 62-63, 73-75. 1922.—Poor care of the crop in field and during overwintering may result in loss of 10% of the crop. It is recommended that potatoes be spread out, mixed with 3 parts wood ashes and 1 part air-slaked lime for 4-5 days before overwintering. For potato "Schorf" [scurf, due to *Rhizoctonia*?] the seed-tubers were sprinkled with slaked lime and thus freed from the disease which was present in untreated tubers.—E. Baudyš.

5222. BAXTER, DOW V. The genus *Ribes* with reference to the white pine blister rust in the west. Papers Michigan Acad. Sci. 2: 1-2. 1923.—The eastern areas of distribution of *Pinus flexilis* are found in the Black Hills of South Dakota and the Laramie Mountains of Wyoming. In both regions the pine is closely associated with species of *Ribes*, particularly *R. cereum*. An unbroken chain of *Ribes* extends to this pine in the Medicine Bow Mountains. Since *Cronartium occidentale* has been found on *Ribes aureum* in northwestern Wyoming it will complicate matters badly if the *Cronartium ribicola* spreads to that region from the north-west Pacific Coast.—Ernst A. Bessey.

5223. BIRMINGHAM, W. A. Sclerotinia rot of passion vine. Agric. Gaz. New South Wales 35: 57-58. 1 fig. 1924.—This disease (*Sclerotinia* sp.) attacks the stem [of *Passiflora edulis*] at about the ground level, resulting in loss of cortex. Initial attacks generally result from wounds made by cultivation implements. It is recommended that diseased plants be removed and burned.—L. R. Waldron.

5224. BRIOSI, GIOVANNI, E RODOLFO FARNETI. Sull' "Avvizzimento dei germogli del Gelso." Ricerche compilare sopra manoscritto inedito da G. Pollacci. ["Withering of mulberry shoots." Researches compiled from an unpublished manuscript by G. POLLACCI.] Atti Ist. Bot. Univ. Pavia II, 17: 185-202. Pl. 5-18. 1920.—This is the 3rd report on this disease of the mulberry by the deceased authors. Shoots at the base of mulberry branches in early stages of development wither away, the upper ones follow, and the tip of the branch may wither entirely. Black elliptical spots accompanied by necrosis of the cortical tissues are seen at the bases of the shoots and these spots may girdle the 1-year-old branches. Hypertrophies are observed at the margin of the spots in older branches. The disease is widely spread and has been prevalent for many years, having been observed in 1892 for the 1st time. *Gibberella moricola* (Ges. & De Not.) Sacc. was found growing on the spots and *Fusarium lateritium* Nees. fruiting under the epidermis of the necrotic areas near a withered bud. Inoculations by means of a brush with spores of *Fusarium* at the axil of the leaf, at the point of attachment of naturally dropped or detached leaves, and on a cut bud, and also needle punctures in the cortex of an internode of a 1-year-old branch gave positive results except the ones at the axil of the leaf. The authors maintain that *Gibberella moricola* is the perfect stage of *Fusarium lateritium*, having obtained from ascospores of *Gibberella* the characteristic conidia of *Fusarium*. They also found perithecia of *Gibberella* formed on sclerotia of *Fusarium*.—P. D. Caldis.

5225. BRIOSI, GIOVANNI, E RODOLFO FARNETI. Sulla moria dei castagni (Mal dell' Inchiostro). [The inky disease of chestnut.] Atti Ist. Bot. Univ. Pavia II, 18: 1-93. 17 pl., many col. 1921.—Posthumous unpublished notes arranged by LUIGI MONTEMARTINI including other notes on the subject already published are given here. The authors discuss at length, and disagree with, the theories advanced by various investigators as to the cause of this disease. They find that *Agaricus melleus* and in general the Hymenomycetes and rhizomorphs, the hypertrophies on the roots, the mycelia and the bacteria found by Ducomet and others, on the root extremities, the weakness of the plant, hypogeous fungi, Tuberaceae or mycorrhizas, impoverishment of soils and other physiological agencies, and parasitic or saprophytic fungi which produce secondary changes cannot be considered as the cause of inky disease of chestnut. The authors describe *Coryneum perniciosum* Br. & Far., *Fusicoccum perniciosum* n. sp., and *Melanconis perniciosa* n. sp. as causative agents of this disease, which presents 2 phases, the 1st characterized by attacks of the fungus on the aerial parts of the plant and the 2nd by attacks on the roots. Inoculations with *Coryneum perniciosum* gave positive results. Successful experiments with tree surgery and wound disinfection with copper or iron sulphate are reported in cases where the disease was still in the 1st phase.—P. D. Caldis.

5226. DARNELL-SMITH, G. P. Copper carbonate and the removal of bunt balls from seed wheat. *Agric. Gaz. New South Wales* 35: 11-12. 1924.—An advantage of the copper carbonate treatment is that the removal of bunt balls from the seed wheat is not necessary. A summary of results by the Minnesota Experiment Station obtained with copper carbonate treatments is given.—*L. R. Waldron.*

5227. DORST, J. C. Resistance of several strains of white flowering flax to *Melampsora lini*. Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. *P. 33.* H. Veenman & Sons: Wageningen, 1923.—White-flowering flax as grown in Holland is a population of many biotypes. A selection of 10 plants free from rust in a field severely attacked gives promise of establishing a rust-resistant line, 3 of them having given progeny free from rust in the 2nd year.—*F. Weiss.*

5228. ERIKSSON, JAKOB. Das Mykoplasmastadium von *Phytophthora infestans*. [The mycoplasmic stage in *P. infestans*.] Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. *P. 33-34.* H. Veenman & Sons: Wageningen, 1923.—This is an account of a demonstration of microscopic preparations of potato leaves with incipient blight infections which was given in support of the author's mycoplasma hypothesis.—*F. Weiss.*

5229. FARNETI, RODOLFO. Sopra il "brusone" del riso. Note posthume. [Posthumous notes on rice blast.] *Atti Ist. Bot. Univ. Pavia* II, 18: 109-122. *Pl. 20-24 (col.), 25-29.* 1921.—An historical introduction by LUIGI MONTEMARTINI is followed by 10 lithographed plates with detailed explanations by the deceased author himself, illustrating rice plants attacked by *Piricularia oryzae* and *Helminthosporium oryzae*. The last plate illustrates transitions of *Piricularia* to *Cladosporium* and *Helminthosporium*.—*P. D. Caldis.*

5230. FAWCETT, HOWARD S. Gummosis of Citrus. *Jour. Agric. Res.* 24: 191-236. 8 pl. 1923.—The results of an investigation begun in 1912 are reported. The term gummosis is applied not only to the process of gum formation but also to pathological effects in which gum formation is one of the conspicuous features. It is shown by numerous inoculation tests that 4 important bark diseases of citrus trees may be initiated by as many different fungi.—The *Pythiacystis* gummosis (*Pythiacystis citrophthora*) and Mal di gomma (*Phytophthora terrestria*) are the most destructive and widespread of all the gum diseases. Both are characterized by copious exudations of gum and dead patches of bark on the trunk and main roots. The gum may arise not only from the margin of the invaded area but also from a large contiguous, outer, non-invaded zone. It has been shown that the diseases with all their usual symptoms may be readily transmitted to healthy trees by inoculation with bits of bark from the advancing margins of killed regions of bark. It is not transmitted, however, by tissue from surrounding outer gummy zones or by killed tissue not recently invaded. Cultural tests have shown that viable mycelia of the causal organisms are present in this narrow band or fringe at the advancing edges of the killed region of bark but are absent or dead elsewhere. A species of *Fusarium* was commonly found associated with *Pythiacystis citrophthora* and the results of a few tests indicated that it aggravates the severity of the disease but is incapable of initiating it. Both observations and experiments showed the following decreasing order of resistance to *P. citrophthora*: Sour orange (*Citrus aurantium*), trifoliate orange (*Poncirus trifoliata*), rough lemon (a resistant variety of *C. limonia*), pomelo (*Citrus grandis*), sweet orange (*C. sinensis*), and common lemon (*C. limonia*).—*Botrytis* gummosis (*B. cinerea*) causes a softening of the invaded bark in the early stages; later the outer layer of bark is killed and hardens long before the inner layer. As in *Pythiacystis* gummosis, there is a non-infected, outer gummy zone. There is a stronger tendency towards the renewal of the bark under the dead layer than in *Pythiacystis* gummosis and the flow of gum is less copious.—*Sclerotinia libertiana* is occasionally found associated with rapid dying of bark on roots and trunks of citrus trees growing in damp, cool situations, especially after severe frosts. At first there is a plentiful flow of gum and the bark is soft, but subsequently the bark dries into long shreds and usually contains flat, black sclerotia. Though the fungus normally advances more rapidly than *Botrytis*, it is soon arrested and callus begins to form when the gum accumulates.—Minor forms of gumming were brought about by inoculations with *Penicillium roseum*, *Fusarium* sp., *Diplodia* sp., *Coryneum Beijerinckii*, *Coprinus atramentarius*, *Alternaria* sp., and *Hypholoma* sp. These minor forms of gumming, however, did not have any visible

effect in producing definite bark diseases.—Gum in citrus appears to originate mainly in the xylem tissues by hydrolysis of the cellulose walls. Mechanical injuries, continuous pressure on the bark, and obstructions of the sap current by the insertion of glass or wooden plugs, etc., failed to cause gum formation in citrus trees when the tissues were healthy and not irritated by chemical stimuli. Injuries by certain insects, e.g., *Tortrix citrana* and grasshoppers, sometimes result in slight gum formation, probably due to secretions by the insects or to contamination. Observations and experiments indicate that burning and freezing are not in themselves important factors in gum formation in citrus but merely aid the wood-rotting organisms which later induce gummosis. Partial desiccation may accelerate the process after it has begun. Certain chemical substances, chiefly acids, alkalies, and salts of heavy metals (especially the last-named) can induce gum formation when injected into citrus bark, but in no case was it possible to reproduce all the symptoms of any of the gum diseases by such injections. The results of comparative experiments with filtrates from diseased and healthy tissue show that the former contain a substance capable of passing through a fine clay filter and of inducing mere gum formation but not the other symptoms of bark diseases. This capacity was destroyed by boiling, indicating the presence of a heat-sensitive enzyme in the filtrate from diseased tissue. A bibliography of 65 titles is appended.—*Author*.

5231. FISHER, D. F., AND CHARLES BROOKS. Control of brown rot [*Sclerotinia cinerea* (Bon.) Wor.] of prunes and cherries in the Pacific Northwest. U. S. Dept. Agric. Farmers' Bull. 1410. 12 p., 14 fig. 1924.

5232. GOPALASWAMI RAO, C. S. Some fruit diseases and their remedies—Mango. Jour. Madras Agric. Students Union 10: 251-254. 1922.—The following fungous diseases of *Mangifera indica* are noted with control measures: mildew (*Oidium* sp.) sooty mold (*Capnodium Mangiferum*), blight (*Pestalotzia Mangiferae*), black stem (*Rhizoctadium corticolum*), red rust (*Cephaleuros virescens*), and bark rot (*Corticium* sp).—*P. S. Jivanna Rao*.

5233. HAENSELER, C. M. Spraying experiments for the control of pear fruit- and leaf-spot. Ann. Rept. New Jersey Agric. Exp. Sta. 42: 473-474. 1920/21 [1922].—Commercial lime-sulphur, Bordeaux mixture, and Pyrox all gave satisfactory control of *Fabrea maculata* but their use resulted in injury to the fruit. Although the control on trees sprayed with self-boiled lime-sulphur was not as efficient, there was considerably less fruit injury. For the control of the disease, 4 applications of self-boiled lime-sulfur are recommended, the 1st about 10 days after petal fall, 2 more at intervals of 10-14 days, and a 4th about 3 weeks after the 3rd.—*Wm. H. Martin*.

5234. HAENSELER, C. M. Studies on eggplant wilt. Ann. Rept. New Jersey Agric. Exp. Sta. 42: 460-472. 1920/21 [1922].—Results of tests establishing the pathogenicity of *Verticillium albo-atrum* are reported. Results of field tests demonstrate that the organism is carried in the soil and in manure. Seed from fruit of wilted plants were not found to carry the wilt organism.—*Wm. H. Martin*.

5235. HUNGERFORD, CHARLES W., AND C. E. OWENS. Specialized varieties of *Puccinia glumarum* and hosts for variety *tritici*. Jour. Agric. Res. 25: 363-402. 6 pl. 1923.—This paper lists 59 species of wild grasses which have been shown to be hosts for stripe rust in the U. S. A.; 33 of these, as well as wheat, rye, barley, emmer and speltz, have been found naturally infected in the field. The specialized variety (biologic form) *P. glumarum tritici* is the one commonly occurring in the U. S. A. It has been shown that this variety, commonly found on wheat, also infects rye moderately, barley slightly, and in addition 47 wild grasses. There are indications (1) that the variety *P. glumarum hordei* is also present in the U. S. A.; (2) that there are strains of several grass species which may react differently to the same variety of rust; (3) that there are 2 or more strains or specialized races of *P. glumarum tritici*. Over 160 varieties of wheat and wheat allies were tested for resistance at Corvallis, Oregon. A marked difference in resistance is shown. Many of the common wheats are resistant to the strains of stripe rust worked with. Varieties which became infected in the head were greatly reduced in yield. Leaf infection in the seedling stage has been more severe in spring-sown wheat. Leaf infection at heading time has been more severe in fall-sown wheat. Resistance is evidenced by the development of large killed areas on the leaves. Photographs are given showing various grades of resistance.—*C. W. Hungerford*.

5236. JACZEWSKI, A. DE. Sur le developpement menacant du *Tilletia secalis* Kühn en Russie pendant les dernières années. [The menacing development of *T. secalis* Kühn in Russia during recent years.] Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 267-272. H. Veenman & Sons: Wageningen, 1923.—This fungus was first found in 1884. Losses in 1910 amounted to 90%; in 1920-1921, 1-8%. In 1922, 10-60% infection was observed and is considered a source of future danger. *T. Secalis* and *T. Triticici* are probably of Asiatic origin.—*Harry Braun*.

5237. JONES, F. R. Mycorrhizal fungi in the roots of legumes. Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 204-205. H. Veenman & Sons: Wageningen, 1923.—A yellow condition of pea roots was found to be associated with the presence of a mycorrhizal fungus similar to that found by Magrou in *Orobis tuberosus*.—*Harry Braun*.

5238. JONES, F. R. Root-rot of peas in the United States. Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 203-204. H. Veenman & Sons: Wageningen, 1923.—This is caused by a new variety of *Fusarium Martii*, by *Aphanomyces* sp., and by 2 lesser parasites.—*Harry Braun*.

5239. KING, C. J. Habits of the cotton root-rot fungus. Jour. Agric. Res. 26: 405-418. 7 pl., 4 fig. 1923 [1924].—A study was made of the manner and rate of spread of the root-rot disease and the conditions favorable for the fructification of the causal fungus, *Ozonium omnivorum* Shear. The behavior of the disease in spreading radially, with areas becoming free from the disease after the mycelium has passed on, and the formation of fruiting bodies about the ring of most recent activity is compared to the habit of fairy-ring fungi. It was observed that many of the large spots in alfalfa fields showed no renewed infection at the beginning of a new season of disease activity, but in the case of most of the smaller spots the diseased area of 1 year seemed to be merely an extension of the diseased area of the previous season.—A method of controlling the disease by providing barriers for segregating new centers of infection and saturating the soil around them with formaldehyde solution was found effective and may suggest means of determining a more practical method of control.—*Author*.

5240. KORSTIAN, C. F. Control of snow molding in coniferous nursery stock. Jour. Agric. Res. 24: 741-748. 3 pl. 1923.—From 1906 to 1921 at the Cottonwood Nursery in central Utah very serious winter losses of Douglas fir (*Pseudotsuga taxifolia*) and Norway spruce (*Picea excelsa*) seedlings and transplants occurred under the snow from attacks by weakly parasitic fungi, chiefly *Botrytis cinerea* and a dark sterile mold as yet unidentified. At this nursery (elevation 7,450 feet) these snow-molding fungi caused a greater loss of coniferous nursery stock than any other form of injury or disease. Practically all age classes and species grown in the nursery, excepting lodgepole pine (*Pinus contorta*), are subject to this disease. It is more prevalent among 1- and 2-year seedlings than in the older age classes. Among the older seedlings and transplants the weak and previously injured trees are the ones generally attacked. Experiments showed that the disease can be controlled effectively in the nursery by placing a protective framework over the bed so that the full weight of the snow does not lie heavily on the trees so as to press them flat on the ground. This is by far the best and most efficient method of control which has been developed.—*Author*.

5241. KROUT, W. S. Control of lettuce drop by the use of formaldehyde. Jour. Agric. Res. 23: 645-654. 1 pl., 3 fig. 1923.—Data are presented showing the number of minutes required to kill small and large sclerotia of *Sclerotinia libertiana* when soaked in formaldehyde solutions. A 1:50 solution killed them in 15 and 20 minutes respectively, a 1:100 solution required 15 and 30 minutes, while a strength of 1:200 took 75 and 90 minutes respectively. Similarly, mycelium of the fungus was killed in 10 minutes by the 2 stronger solutions and in 15 minutes by the weakest. Aspirating the sclerotia had no effect, but drying made them more resistant "emphasizing the value of keeping infested greenhouse soil moist for 5 to 10 days before treatment." The amount of drop was reduced from 50 to 2% by using a 1:100 solution at the rate of 1 gallon per square foot. Moist sclerotia were killed even when buried to a depth of 20 inches, but not all the desiccated ones. Covering the beds after drenching was not thought beneficial. Plants could be set in treated beds within 8 days, or sooner if only small spots were drenched. Treatment of soil by this method increased the yield 23% in 1 case.—*A. G. Newhall*.

5242. LARUE, CARL D., AND H. H. BARTLETT. A leaf-fall disease of *Hevea brasiliensis* Muell.-Arg. due to *Gloeosporium alborubrum* Petch. Papers Michigan Acad. Sci. 2: 73-90. 1923.—In the rubber plantations of Asahan, Sumatra, a severe leaf-fall disease occurred in 1918. The host normally sheds all of its leaves and remains bare and dormant for some time, then sends out new growth as do trees of temperate regions. In affected trees these new leaves began to fall when about $\frac{1}{4}$ grown, separating from the petioles which themselves fell later. Immediately a new set of leaves was produced which in turn often fell, to be followed by a third set of leaves. Trees of all ages were affected but the damage was slight in places where the trees were thrifty; on poor soils the leaf fall was very severe. Cultures were made from fallen leaves, from petioles still attached to the twig, from the twig near the base of such bladeless petioles, from the tips and from the bark and wood of these twigs. In 59% of the cases *Gloeosporium alborubrum* Petch (probably the same as *G. Heveae* Petch) developed. When the bare petioles and the region of the twig around the base of the petioles were cultured, over 80% showed *Gloeosporium alborubrum*; the remainder of the cultures were either sterile or showed miscellaneous fungi. The same *Gloeosporium* was isolated from curled, twisted, mature leaves, from leaf spots, from yellow leaves, from prematurely falling fruits, and from extensive dead areas along the margin and at the tip of the leaves. Inoculations with *G. alborubrum* are not entirely convincing because of the development of the fungus in a part of the check plants. However, where the spores were sprayed upon the experimental plants the disease appeared in virulent form, causing rotting of leaves and twigs or large blotches on the leaves; the checks when developing the disease merely showed a growth from dormant mycelium in the twig up into the petioles, causing leaf-fall. It is suggested that leaf-fall is due to semi-dormant twig infection going up into the petioles. Control should look toward making the soil more fertile and the trees more thrifty.—*Ernst A. Bessey*.

5243. LARUE, CARL D., AND H. H. BARTLETT. Diplodia disease of *Hevea brasiliensis*. Papers Michigan Acad. Sci. 2: 91-107. 1923.—In Asahan, Sumatra, a die-back of twigs and branches is caused by *Diplodia cacaoicola* P. Henn. This fungus inoculated into potato tubers entirely liquefies the contents except the starch grains. This is a quick means of distinguishing this fungus from other fungi parasitic on *Hevea*. The *Diplodia* fruits only on solid cultures when these begin to dry out. Numerous inoculation experiments showed the pathogenic nature of this fungus and its rapid growth in wood, cambium and bark. It is the cause of the "black thread" in the wood, as that occurs in Sumatra, no trace of *Phytophthora Faberi* being found, although the latter is the ascribed cause of this phenomenon in some parts of the tropics. The moldy rot of the cut surface of bark where tapping has been practiced is also due to the *Diplodia*. Seed deterioration is caused frequently by this fungus. The infected tapped surfaces eventually heal over without much permanent injury to the tree.—*Ernst A. Bessey*.

5244. LAURITZEN, J. I., AND L. L. HARTER. Species of *Rhizopus* responsible for the decay of sweet potatoes in the storage house and at different temperatures in infection chambers. Jour. Agric. Res. 24: 441-456. 1923.—A description is given of an apparatus for the control of temperature. A method of controlling humidity is also given.—*Rhizopus nigricans* Ehrenb. and *R. Tritici* Sarto are the species primarily responsible for the decay of sweet potatoes known as soft-rot at Washington, D. C., *R. nigricans* at temperatures between 6° and 20°C., and *R. Tritici* at 30°C. and above, the 2 overlapping between 20° and 30°C.—The temperature range for infection by *R. Tritici*, *R. nigricans*, and *Mucor* is so wide as to exclude the possibility of storing sweet potatoes beyond the limits of this range.—*R. Tritici*, *R. Oryzae*, *R. reflexus* Bainier and *R. artocarp*i Racib. can not compete successfully in the infection of sweet potatoes with *R. nigricans* at temperatures of 12°, 14°, and 18°C.—*J. I. Lauritzen*.

5245. LÖHNIS, MARIA P. On the resistance of the potato tuber against *Phytophthora*. Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 174-179. II. Veenman & Sons: Wageningen, 1923.—Varieties from Holland, Germany, America and England were studied for correlation of tuber characters with resistance to late blight. *Phytophthora infestans* was cultivated on raw sterile potato blocks and also inoculated into whole tubers. No correlation was found between the degree of extension in the parenchyma and resistance of the tubers to late blight rot. In the variety Bravo, which has susceptible foliage and resistant

tubers, resistance was still exhibited in peeled tubers, but no anatomical difference was found in the sub-peridermal tissue of Bravo and susceptible varieties. The rate of wound-cork formation in Bravo and susceptible varieties was the same, and no correlation existed between thinness of skin and susceptibility in the field.—Tubers of the variety Eigenheimer, which is susceptible to rot in the field, were selected from sandy and from clay fields and subjected to experimental inoculation. Infection was practically limited to the tubers grown in clay. A constant difference was found in the lenticel structure of tubers from the 2 sources—those in clay soil showing unsuberized parenchyma, whereas those in sandy soil possessed several layers of suberized cells. Infection also occurs through small injuries in the periderm; this is a common source of infection in the field.—*F. Weiss.*

5246. LO PRIORE, GIUSEPPE. The "Ink Disease" of the chestnut. Internat. Rev. Sci. and Pract. Agric. N. S., 1: 600-607. 1923.—A summary of present knowledge of the characteristics, cause, and control of the disease is given, including the work of Briosi and Farneti [See Bot. Absts. 13, Entry 5225], Petri, and others. Observations made by the author are added, upholding Petri's work on the cause of the disease. The disease attacks the roots, forming a characteristic black substance which extends upwards into the trunk and downwards to the main radicle system, from which it exudes. It is caused by *Blepharospora cambivora*, which is able to penetrate the cortex of roots although it may live first as a saprophyte on the old cortex of the trunk. The fungus attacks the tree a little above ground level in the region of the root-collar or at the base of the largest roots. *Coryneum perniciosum* appears on trees already suffering from ink disease and according to the author can occur without producing any specific primary malady. The infection does not seem to be transmissible since healthy shoots commonly grow from infected roots. Infected trees are as common in dry soils as in wet soils and young trees are as susceptible as old ones. No host other than the chestnut has been found. Control measures recommended include: quarantine restrictions on exportation from areas known to be infected; avoiding spreading of infected soil into immune areas; destruction of dead trees; liming of infected soil; avoiding infected leaves as manure in young nurseries. *Castanea dentata* is reported severely attacked and *C. mollissima* resistant. The efficacy of grafting Italian chestnuts on the Japanese variety is still doubtful since the disease resistance of the stock and the graft affinity between the 2 varieties are not definitely known.—*Wanda Weniger.*

5247. MAARSCHALK, H. Control of American gooseberry mildew by alkaline Burgundy mixture. Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 119. H. Veenman & Sons: Wageningen, 1923.—A spray of Burgundy mixture with excess of Na_2CO_3 is an excellent remedy.—*Harry Braun.*

5248. MANGIN, L. Un nouvel ennemi de nos habitations: le *Phellinus cryptarum* Karst. [A new enemy of construction timber.] Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 196-198. H. Veenman & Sons: Wageningen, 1923.—This fungus causes a dry rot, the symptoms varying with the wood attacked. Transverse cohesion of tissue is first destroyed, whereas the longitudinal cohesion is often unharmed. A superficial sterile stroma is formed. The dorsal part of the fructification is brown, often vaguely zoned. The morphology is described in detail.—*Harry Braun.*

5249. MEER, JIKKE H. H. VAN DER. Verticillium wilt. Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 31-32. H. Veenman & Sons: Wageningen, 1923.—This lists the hosts in Holland of a tracheomycosis caused by *Verticillium* spp. The strains isolated could be grouped into 2 classes showing morphologic differences, the one from potato, cucumber, tomato and cherry agreeing with *V. albo-atrum* Rke. & Berth., the other from a number of garden plants agreeing with *V. Dahliae* Klebahn. Both types grow on sterilized soil and survive freezing. Stem, root and soil inoculations with *Verticillium* isolated from cherry and potato caused wilting of 1-year-old cherries. Thus the wilt of potatoes may be a source of infection for cherries.—*F. Weiss.*

5250. NOBÉCOURT, P. Sur la production d'anticorps par les tubercules des Ophrydées. [Production of antibodies in tubercles of the Ophrydeae.] Compt. Rend. Acad. Sci. Paris 177: 1055-1057. 1923.—These tubercles are attributable to a certain endophytic fungus, *Orcheomyces*. Noel Bernard showed in 1911 that this fungus will grow on a gelatin plate unless it is

near an aseptic fragment of the tubercle of one of the Ophrydeae, *Loroglossum hircinum*. The author here confirms this result. He further finds that tubercles treated by heating, freezing, or chloroforming are readily invaded by the fungus. It is concluded that the fungicidal antibody of the host is destroyed by heat, freezing, or chloroform.—*C. H. Farr.*

5251. PATKANIANE, A. Expériences sur l'emploi de la soude comme fungicide contre les Erysiphées. [Experiments on the use of soda as a fungicide against the Erysiphaceae.] Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 275-276. H. Veenman & Sons: Wageningen, 1923.—Soda is an active fungicide capable of stopping the development of *Sphaerotheca macularis*. It does not adhere well and repeated applications are required.—*Harry Braun.*

5252. PELTIER, GEORGE L. A study of the environmental conditions influencing the development of stem rust in the absence of an alternate host. (II. Infection studies with *Puccinia graminis tritici* Form III and Form IX.) Nebraska Agric. Exp. Sta. Res. Bull. 25. 52 p., 12 pl. 1923.—Comparing the reactions of the 2 biologic forms on 13 differential hosts grown under controlled variations of soil and moisture, soil temperature, and air temperature, the following conclusions were reached: (1) The general form of infection of a biologic form on a differential host was in no instance changed by (a) any of the environmental factors to which the differential host and biologic form were submitted, (b) the source of the inoculum, or (c) the source of seed of the differential hosts. (2) In the main the types of infection obtained with the 2 biologic forms on the differential hosts checked with those worked out by Stakman and Levine. A heterogeneous type of infection was obtained on 3 Durum varieties instead of a type reported by Stakman and Levine. (3) The best development of the differential hosts at the seedling, stooling, jointing, and heading stages occurred at 15 and 20°C. Temperatures of 10°C. and below resulted in a slow growth, whereas temperatures of 25 and 30°C. inhibited the growth of the plants. (4) The optimum temperature for initial infection with Form III is about 25°C., whereas with Form IX it is nearer 20°C. The temperature range suitable for initial infection with Form IX is about 5°C. lower than with Form III. (5) The optimum temperature for the development of the disease with both forms on plants in the seedling, stooling and jointing stages was between 20 and 25°C. No infection occurred at temperatures of 10°C. and below, and only a few plants of some differential hosts were infected at 15 and 30°C. With plants at the heading stage a lower optimum temperature for infection occurred, in that no rust developed at 30°C., whereas it did at 10°C. (6) The temperatures at which the plants make their best growth are generally the same as those at which the best development of the disease takes place. (7) The period of incubation of Form IX has been extended over a long period of time (7-9 weeks) by submitting inoculated plants to low temperature. The length of this period depends not only on the temperature, but also on the stage of development of the organism in the leaf tissues of the host.—*T. A. Kiessbach.*

5253. POLLACCI, GINO. La sporotricosi delle pesche. Nuova malattia manifestatasi in Liguria. [The sporotrichosis of peaches.] Atti Ist. Bot. Univ. Pavia II, 17: 203-207. Pl. 19. 1920.—A new disease of the fruit of the peach in the province of Liguria, Italy, is described and attributed to *Sporotrichum Persicae* n. sp. This organism attacks fruit in different stages of development forming white, rather well defined spots on the pericarp. The organism invades only a few cells of the trichomatous stratum and grows mostly among the hairs. A description of the fungus is given as well as a few cultural characteristics. Artificial inoculations were successful when the fungus was applied by means of a brush but not when a needle was used. CuSO_4 inhibits germination of the spores.—*P. D. Caldis.*

5254. POOLE, R. F. Celery disease investigations. Ann. Rept. New Jersey Agric. Exp. Sta. 42: 461-462. 1920/21 [1922].—Where formaldehyde was applied at the rate of 3, 4, and 6 pints to 25 gallons of water in the seed bed, poor control of damping off (*Sclerotinia libertiana*) resulted. With the same amount of formaldehyde but with 50 gallons of water, the control was complete.—*Wm. H. Martin.*

5255. RANGASWAMY AYYANGAR, C. Mildew on grapes. Jour. Madras Agric. Students Union 10: 9-11. 1922.—A popular account of the mildew (*Oidium* sp.) is given with a statement showing the quantity of chemicals used for spraying, which must be done at least 4 times during the season.—*P. S. Jivanna Rao.*

5256. ROBERTS, JOHN W. A budrot of the peach caused by a species of *Fusarium*. Jour. Agric. Res. 26: 507-512. 1 pl., 1 fig. 1923 [1924].—A bud rot of the peach occurring in the southeastern U. S. A. is shown to be caused by a fungus considered to be identical with *Fusarium gemmiperda* Aderhold. It is shown by inoculation with conidia from pure cultures that the fungus can destroy the buds of both sweet and sour cherries in addition to those of peach. Though the distribution of the disease and the amount of damage are unknown, it is suggested that many of the instances in which peach buds are killed without apparent cause may be attributed to this disease. Excessively moist conditions are necessary for its development.—B. O. Dodge.

5257. ROSEN, H. R., AND J. A. ELLIOTT. Pathogenicity of *Ophiobolus cariceti* in its relationship to weakened plants. Jour. Agric. Res. 25: 351-358. 5 pl. 1923.—*Ophiobolus cariceti* was discovered in Arkansas in 1921. Wheat, *Bromus secalinus*, *Chaetochloa geniculata*, *Festuca octoflora*, *F. elatior*, and *Hordeum pulsillum* were found to be infected. The fungus was compared with the type material of *Ophiobolus Andropogonis* and with co-type material of *O. Festucae* and was found to differ essentially from these fungi. The latter material was found to belong to the genus *Lophodermium* and is perhaps close to *L. arundinaceum* (Schrod.) Chev. var. *alpinum* Rehm. Other species of *Ophiobolus* which have been considered but which from their descriptions are judged to be different are listed.—Infection appears to be confined to weakened plants. Lack of proper nutrients and water-logged soils in particular were found to be conducive to attacks. In an experiment involving the use of lime, manure, and commercial fertilizer on different plots of a field in which *Ophiobolus* had previously been discovered attacking a large area of growing wheat, it was found that commercial fertilizer almost completely eliminated the disease, manure considerably decreased the percentage, and lime increased the incidence of infection.—Since the results involve only 1 year's experimental work, the authors do not make definite recommendations, but believe that since their work is confirmed by numerous other writers there seems to be sufficient ground for concluding that *Ophiobolus cariceti* confines its attacks to weakened plants. A brief discussion of the literature and a bibliography of 18 numbers is included.—V. H. Young.

5258. ROUSSAKOV, L. Observations sur l'influence des conditions meteorologiques sur le développement de la rouille des céréales. [Influence of meteorological conditions on development of cereal rusts.] Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 277-280. H. Veenman & Sons: Wageningen, 1923.—In southeastern Russia humidity is the chief factor in rust development. A relative humidity of 100% suffices for spore germination even in the absence of liquid water. In spring and autumn temperature is a leading factor since fluctuation is necessary for maximum spore germination. Light is a factor in germination and dissemination. Rust development is greater in the north on account of more favorable meteorological conditions.—Harry Braun.

5259. SARMIENTO, VALERIANO M. Insect carriers of *Diplodia* in storage-rots. Philippine Agric. 12: 77-91. 1923.—Twelve species of insects belonging to 10 families were found capable of carrying spores of *Diplodia* sp. and infecting stored crops.—Sam F. Trelease.

5260. SCHITIKOVA, A. Sur les moyens de combattre le charbon des céréales à l'aide des températures élevées. [Combating smut of cereals by aid of high temperatures.] Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 272-275. H. Veenman & Sons: Wageningen, 1923.—Dry heat at 60°C. for 24 hours does not injure germination of wheat and is efficacious against smut.—Harry Braun.

5261. [SCHOENE, W. J.] The cedar rust campaign. Quart. Bull. Virginia State Crop Pest Commission 5: 1-4. 1923.—This report contains general information as to the cedar eradication work in Virginia during the winter of 1922-1923.—F. D. Fromme.

5262. SCHOEVERS, T. A. C. Some preliminary experiments for disinfecting flax seed carrying *Botrytis*-disease. Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 116-117. H. Veenman & Sons: Wageningen, 1923.—Treatments for this disease with Germisan, Uspulun, calcium bisulphite, and mercuric chloride show favorable results with Uspulun and mercuric chloride.—Harry Braun.

5263. SNELL, WALTER H. The effect of heat upon the mycelium of certain structural-timber-destroying fungi within wood. Amer. Jour. Bot. 10: 399-411. 1 fig. 1923.—*Lenzites*

sepiaria, *L. trabea*, *Trametes serialis*, *T. carnea* and *Lentinus lepideus*, 5 of the most common wood-destroying fungi found growing in cotton-mill roofs (but not including the dry-rot group), were tested as to their ability to survive varying degrees of moist and of dry heat applied for varying periods. Tests were made on small blocks of Sitka spruce. In moist heat the most resistant of the fungi was killed in $3\frac{1}{2}$ days at 44°C . and in 12 hours at 55°C .; in dry heat, 20 days at 70°C . did not kill the most resistant, nor did 12 hours at 100°C .; although all succumbed in 12 hours at 105°C . dry heat. Species differed considerably in resistance, but the thermal death curve bore no direct relation to the thermal growth curve. Heat applied to buildings as a sterilizing agent can be of little avail against the 5 fungi tested, although periodic heatings of such structures may be of service in checking decay through drying out of the timbers. Heating before structures are painted or occupied is recommended. A sufficient heat is employed in the various kiln-drying and wood-preservation processes to sterilize the wood treated.—*E. W. Sinnott*.

5264. SPIERENBURG, DINA. A new elm-tree disease. Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 123-124. H. Veenman & Sons: Wageningen, 1923.—*Graphium Ulmi* has been isolated from diseased trees showing drying of the leaves, beginning at the top of the tree. Inoculations have not been successful.—*Harry Braun*.

5265. STAHEL, G. De krullotenziekte in Ecuador. [The witchbroom disease in Ecuador.] West Indië 8: 97-100. 1923.—In 1922 J. B. Rorer discovered for the 1st time, in the district of Balao, Ecuador, the witchbroom disease in cacao. In Ecuador it is difficult to combat the disease as the trees are not pruned and reach a height of 10-12 m. Rorer states that the disease reaches a maximum after a certain number of years, after which it diminishes somewhat. During this time probably many of the plantations have to be abandoned. It is likely that the disease comes from 2 wild species of cacao,—cacao blanco (*Theobroma bicolor*) and cacao del monte (*T. balaoensis*). As young plants of *T. speciosum*, which is related to *T. bicolor*, are susceptible to the disease it was supposed by Van Hall that the same would be the case with older individuals. However, the reverse was observed, as old trees are hardly susceptible. It may be possible that in Ecuador there are in forests isolated groups of the real cacao; from these individuals spores of the witch broom disease may be distributed by the wind over hundreds of km. to the plantations.—*J. C. Th. Uphof*.

5266. STRAŇÁK, F. Rolníci mořte osivo před setím. [Treat cereal seed before sowing.] Ochrana Rostlin 2: 1-3. 1922.—The author refers to successful results with 0.2% solution of formalin for 50 minutes for wheat and oat smuts [covered?], and describes the procedures used with copper sulfate, Uspulun, Germisan, and the Koncelovo seed treatment solution. The loose smuts of wheat and barley (*Ustilago Tritici* and *U. nuda* respectively) can be controlled by the following hot water treatment: 8 hours in water at 20°C ., then 10 minutes at 52°C .; for "summer" wheat, 4 hours at 40°C ., then 10 minutes at 52°C .—*E. Baudyš*.

5267. STRAŇÁK, F., A AD. KUTÍN. Hubení plevelů. [Weed destruction.] Ochrana Rostlin 2: 13-17. 6 fig. 1922.—The role of weeds in spreading diseases of cultivated crops is discussed. During the past year *Plasmodiophora Brassicae* was abundant on wild mustard and on cress, both of which are destructive and widely distributed weeds. The writer recommends cleaning seed, cultivation, crop rotation, destruction by chemicals like iron sulphate in 15-20% and 25-30% solution, or by a sprinkling of 6-8 parts kainit and 0.7 parts calcium cyanamide per hectare.—*E. Baudyš*.

5268. TEHON, L. R. Progress in barberry eradication in Illinois during 1919. Trans. Illinois Acad. Sci. 13: 219-225. 1920.—This work to date has been chiefly confined to towns. There are notes on the amount and distribution of escaped plants, and also on infected fields.—*W. G. McGinnies*.

5269. VANINE, E. Essai d'évaluation des pertes causées forestières aux espèces par les champignons parasites. [Losses caused by parasitic fungi on forest trees.] Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 258-262. H. Veenman & Sons: Wageningen, 1923.—Quantitative methods used by foresters were applied to forest disease surveys. Several plots of half-hectare area were chosen, such that the total surface was 5-10% of the total growth area of the "type" or crop surveyed. Counts of diseased trees were classified under the names of the parasites. Tree diameter, and number and disposal of fructifications

are considered. The average infection percentage thus obtained is considered that of the forestry unit under observation.—*Harry Braun*.

5270. VANINE, E. La pourriture annulaire du chêne, produite par le *Vuilleminia comedens* Maire. [Annular rot of oak caused by *V. comedens*.] Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 263-264, 2 fig. H. Veenman & Sons: Wageningen, 1923.—Young trees attacked by this fungus were found in Tambov. Desiccation of lateral branches and the presence of fruiting bodies are characteristic symptoms. A rotted white ring is formed at the periphery of the trunk. Since the trees were on elevated ground this organism does not require moist conditions to become a parasite, as other workers claim.—*Harry Braun*.

5271. VANINE, E. Le *Hydnum septentrionale*, parasite des arbres à feuilles. [H. septentrionale, parasitic on deciduous trees.] Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 264-267, 2 fig. H. Veenman & Sons: Wageningen, 1923.—This was found on *Acer platanoides* and *Ulmus effusa* near Petrograd. Medullary rays are most resistant to the rot. A coloring matter within the rays is considered to be wound gum.—*Harry Braun*.

5272. WESTON, WILLIAM H., JR. A method of treating maize seed to destroy adherent spores of downy mildew. Jour. Agric. Res. 24: 853-860. 1923.—Because of the danger of introducing downy mildews (*Sclerospora* spp.) from the Orient on maize seed, it has been necessary to grow importations in quarantine greenhouses. The writer finds that oospores adherent to the seed can be destroyed with absolute certainty and without injury to the seed by treatment with H_2SO_4 after a preliminary wetting with alcohol. The oospores (both fresh and dried 2 years) of the *Sclerospora* species so common on *Saccharum spontaneum* L. and *Miscanthus japonicus* (Thunb.) Anders. in the Philippines were mounted and a drop of concentrated H_2SO_4 drawn under the cover glass. Immediately the spores swelled and either burst or split open. After 5 minutes all the spores were exploded or collapsed and empty. When a drop of alcohol was first drawn under the cover glass, allowed to stand 1 minute, and then replaced by the acid, the extrusion of the content was more complete and rapid. Dry seeds of typical dent, flint, sweet, pop, and waxy endosperm varieties of maize were put in separate glass jars and covered with alcohol for 1 minute, drained, and covered with concentrated H_2SO_4 , and stirred occasionally during the 5-20 minute periods of treatment. The acid was then drained off, and the seeds washed 1 hour in running water; $\frac{1}{2}$ the treated seeds were immediately planted, the other $\frac{1}{2}$ dried and planted from time to time. Even after the most severe treatment a considerable percentage of the seed retained its viability for as much as 3 months. After considerable experiment, 5-10 minutes of soaking in the acid was considered sufficient. If planted at once, the percentage of germination of seed so treated is only slightly reduced; if dried and preserved, the percentage of germination declines gradually. Even after 3 months, however, enough normal plants result to meet all practical purposes.—Preliminary experiments indicate that this method is equally effective against *Physoderma* disease of maize; and that it can be used successfully with the seed of teosinte (*Euchlaena luxurians* Schrad.), coix (*Coix lachryma-jobi* L.), and some varieties of sorghum (*Andropogon Sorghum* (L.) Brot.).—*Author*.

5273. WHITE, H. G. Spraying experiments for downy mildew. Agric. Gaz. New South Wales 35: 94. 1924.—Bordeaux mixture used at different strengths was successful in keeping the small outbreak of the disease in check in vineyards. Both casein and fish oil were found to be satisfactory spreaders for the mixture.—*L. R. Waldron*.

5274. WILTSHIRE, S. P. Canker control trials. Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta. 1921: 70-73. 1921.—The results of a preliminary study of the effectiveness of spraying with copper stearate for the control of cankers caused by *Nectria galligena* Bres. are given and apparently do not indicate that the disease can be controlled in this way. There was not enough infection, however, to give conclusive information.—*W. H. Chandler*.

5275. WILTSHIRE, S. P. The Michaelmas daisy disease. Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta. 1921: 74-76. 1 fig. 1921.—This is a report of some inoculation experiments with a fungus isolated the previous summer, indicating that the organism isolated is the cause of the disease. The fungus has not yet been named.—*W. H. Chandler*.

DISEASES CAUSED BY BACTERIA

5276. DUFRENOY, J. Gommose locale et générale résultant des lésions bactériennes des feuilles. [Local and general gummosis resulting from bacterial lesions of leaves.] Compt. Rend. Soc. Biol. 88: 122-124. 6 fig. 1923.—Various bacteria produce gummosis of leaves which they attack. A lesion which seems to be localised may produce metabolic disturbances in the entire organism.—*Oran Raber*.

5277. ELLIOTT, CHARLOTTE. A bacterial stripe disease of proso millet. Jour. Agric. Res. 26: 151-160. 4 pl. 1923.—*Bacterium panici* n. sp. is described culturally and morphologically and compared with organisms attacking related plants such as broom corn and sorghum. Lesions of the disease are described as narrow, brown, water soaked streaks 1-several inches long, occurring on leaves, sheaths and culms, sometimes killing the growing point of the plant, and occasionally killing the plant at the crown. The disease has been observed on proso millet (*Panicum miliaceum*) at Brookings, South Dakota, and Madison, Wisconsin. It does not occur on barnyard (*Echinochloa crusgalli edulis*) or foxtail (*Chaetochloa italica* (L.) Scribn.) millets. Observations on field plats have led to the conclusion that the disease is seed-borne.—*Author*.

5278. JONES, L. R., MAUDE M. WILLIAMSON, F. A. WOLF, AND LUCIA McCULLOCH. Bacterial leafspot of clovers. Jour. Agric. Res. 25: 471-490. 6 pl., 3 fig. 1923.—This hitherto undescribed disease is caused by *Bacterium* (or *Pseudomonas*) *Trifoliorum* n. sp. with the group number 212. 2322023. The type strain was obtained from red clover, *T. pratense*, in Wisconsin but the disease occurs in northeastern U. S. A. from Iowa to the Atlantic seaboard and is probably widely prevalent. The reported hosts are *T. pratense* and its var. *perenne*, *T. repens* and its var. *latum*, *T. hybridum*, *T. incarnatum*, *T. alexandrinum*, and *T. pannonicum*. It is primarily a leaf disease but occurs generally on aerial parts, causing irregular dark spots. These may show a milky bacterial exudate which dries to an incrusting film. The parasitic bacteria occur intercellularly and apparently enter chiefly through the stomates. The disease is probably seed-borne and field dissemination is attributed to moisture and insects.—*L. R. Jones*.

5279. MARTIN, WILLIAM H. Inoculated vs. uninoculated sulfur for the control of potato scab. Ann. Rept. New Jersey Agric. Exp. Sta. 42: 449-452. 1920/21 [1922].—In comparing inoculated and uninoculated sulphur, a 600-pound application of the former gave an increase amounting to 46.9% in the number of clean tubers as compared with 10.9% for the latter. In a 2nd test, 300 pounds of inoculated sulphur gave a 24.7% increase in clean tubers as compared with 3.7% for a like amount of uninoculated. In a 3rd test, an application of 900 pounds of inoculated sulphur increased the number of clean tubers 38.2% as compared with 26.1% for the uninoculated sulphur.—*Author*.

5280. MARTIN, WILLIAM H. The influence of sulfur on the control of potato scab. Ann. Rept. New Jersey Agric. Exp. Sta. 42: 442-448. 1920/21 [1922].—In 3 tests conducted with the Irish Cobbler variety, 600 pounds of sulphur applied broadcast before planting showed 44.9, 31.0, and 44.5% increases in the number of clean tubers as compared with 34.0, 31.1, and 41.3% respectively, following an application of 300 pounds. In 3 tests with the American Giant variety, 600 pounds of sulphur gave 53.4, 32.4, and 28.8% increases whereas on adjoining plots 300 pounds gave 37.9, 29.5 and 22.6% increases.—*Author*.

5281. PAINE, SYDNEY G. "Internal rust spot" disease of the potato tuber. (Synonyms: sprain, net necrosis, eisenfleckigkeit, kringeligheid, buntwerden, and maladie des taches en couronne.) Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 74-78. Pl. 7. H. Veenman and Sons: Wageningen, 1923.—Two general types of internal-spot diseases of the potato are recognized, one previously known in England and Ireland as sprain, the other known in England and America as net necrosis. The author regards these as of similar etiology and includes also the other names appearing in the title. From tubers with general symptoms of this sort a bacterium has been isolated which is regarded as new and is named *Pseudomonas solaniolens*. In culture this organism has not behaved consistently, and the suggestion is made that it may exist in at least 2 strains, one of which is characterized by an "earthy potato smell;" morphologically it is a small, oval, non-sporeing rod, motile by a single, long, polar flagellum. The other form is similar in its growth on media but is coccoid

and non-motile, and does not possess an earthy odor. Both cause similar effects when grown on raw potato slices or when inoculated into tubers. The characteristic response of the inoculated tuber is the production of a layer of cork about the wound from which fine corky strands sometimes extend into the surrounding tissue. This suberization is characteristic of the cork masses in the disease known as sprain. In control tubers the process of cork formation about wounds is much less extensive.—*F. Weiss.*

5282. RAND, FREDERICK V., AND LILLIAN C. CASH. Further evidence of insect dissemination of bacterial wilt of corn. *Science* 59: 67-69. 1924.—For bacterial wilt or Stewart's disease (*Aplanobacter Stewarti* E. F. S. emend McCul.) of corn, flea-beetles (*Chaetocnema pulicaria* Melsh.) have been shown (1922) to act as mid-season carriers. In 1923 *C. denticulata* Ill. was shown to be a disseminator of the same kind. The question of primary infection has been narrowed to seed transmission by previous experiments but is now thought to be connected also with insects other than the flea beetles, possibly *Diabrotica duodecimpunctata* Oliv. Insect larval channels are seen at the base of the stem of primary infected plants and the rate of primary infection varies with the abundance of these beetles and with the seasonal conditions that govern their activities. A small proportion of the experiments confirm this hypothesis as do inoculation experiments using intestinal contents of *Diabroticas*.—*C. J. Lyon.*

5283. RIKER, A. J. Some morphological responses of the host tissue to the crown gall organism. *Jour. Agric. Res.* 26: 425-436. 6 pl. 1923 [1924].—A description is given of some responses of the host tissue to the crown gall organism, *Bacterium tumefaciens*, E. F. S. and Town., including such formations as "primary galls," "secondary galls," and "tumor strands." The causal organism was found to initiate its relations with the host in the liquid released by the wound. This liquid was found to flood the neighboring intercellular spaces where the bacteria rapidly followed. From this position they stimulated the adjoining host cells to divide into smaller cells forming a region of hyperplasia while outside this region an area of hypertrophy often developed. When the bacteria were distributed through the intercellular spaces for some distance in a more or less straight course, the subsequent division of the surrounding cells formed a "tumor strand." When inoculations were made near the growing tips of sweet-pea and sunflower plants, which have condensed buds, occasionally "secondary galls" developed at some distance from the points of inoculation, while tumor strands developed in the intervening region. In these plants the flooding of the intercellular spaces for a few mm. in the region of elongation enabled the bacteria to separate themselves from the point of entry by a number of internodes. After the process of elongation, the "secondary galls" were separated from the point of inoculation by a distance which varied with the number of internodes involved and the expansion between the nodes. "Secondary galls" were found 49 cm. from the point of inoculation in a sunflower. Heavy infection near the growing tip prevented the normal elongation of the internodes. No relation was found between the tissue of the "primary" and "secondary galls." "Tumor strands" were found not to be invasive in the sense used by earlier writers.—*Author.*

DISEASES CAUSED BY ANIMAL PARASITES (INSECTS, NEMAS, PROTOZOANS, ETC.)

5284. DAVIDSON, J. The penetration of plant tissue and the source of the food supply of aphids. *Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P.* 72-74. H. Veenman & Sons: Wageningen, 1923.—The structure of the piercing organ and its course in the tissues is described. The phloem is the important source of food supply. Cortex and mesophyll are often drawn upon. Secretion of saliva destroys the middle lamella, causes plasmolysis, and aids in penetration. The host may react by forming cellulose thickenings of the cell walls.—*Harry Braun.*

5285. GOODEY, T. Eelworm disease of potatoes caused by *Tylenchus dipsaci*. *Jour. Helminthology* 1: 197-204. 1 pl. 1923.—A disease of potato tubers simulating the rot associated with late-blight, but which was characterized by the absence of *Phytophthora* and the presence of *Tylenchus dipsaci* in the tissues, was first observed in County Lincoln, England, in 1922. Although this nematode appeared to be the primary cause of the disease, it was followed by saprophytic nematodes and the common organisms of decay so that affected tubers rotted

with great rapidity. A similar disease described by Kühn and later by Ritzema-Bos also was attributed to nematodes, and the similarity to *Phytophthora* rot noted.—In Britain the disease is said to be present in the eastern counties and in Scotland. It was found to persist in the soil for at least a year, during which time the field was cropped with small grains, which, however, were not attacked. Differential susceptibility was found among 2 varieties; in general early potatoes are less subject to attack.—*F. Weiss.*

INFECTIOUS CHLOROSES (MOSAIC AND PEACH YELLOWS GROUPS, ETC.)

5286. ARTSCHWAGER, ERNST F. Occurrence and significance of phloem necrosis in the Irish potato. Jour. Agric. Res. 24: 237-246. 5 pl., 3 fig. 1923.—The phloem of the potato remains normal throughout the vegetative period and up to late maturity of the plant. It is not affected by extremes in environmental conditions but undergoes pathological changes in plants affected with leafroll. These pathological changes in the phloem—lignification of the cell walls, often coupled with obliteration—may also accompany other diseases or be the result of local injuries. However, it is not so much the presence of lignified phloem as its universality in distribution coupled with the absence of necrosis in other tissues which gives it a real diagnostic value.—*Author.*

5287. ATANASOFF, D. Stipple-streak disease of potato. Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 32. H. Veenman & Sons: Wageningen, 1923.—This records the transmission of stipple-streak by means of sap inoculation and by aphids. The incubation period is 1 month. Infected tubers give rise to plants showing secondary stipple-streak.—*F. Weiss.*

5288. DUCOMET, V. Sur la visibilité des symptômes de la mosaïque de la pomme de terre. [Visibility of potato mosaic symptoms.] Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 39-43. H. Veenman & Sons: Wageningen, 1923.—In addition to the chlorotic character of mosaic-infected plants there is sometimes more or less deformation of the leaves which takes the form of curling of the margin, uparching of the intervenal tissue, etc. The relative prominence of chlorosis and deformation differs with the variety and the season. The writer considers, however, that mosaic and "frisolée" are only different aspects of the same malady. In general, low temperature and low humidity favor the production of leaf deformation; elevated temperatures and high humidity bring about the maximum expression of chlorosis. Both symptoms are augmented on plants which are inadequately supplied from the food reserves of the seed piece, and both are prominent on axillary branches late in the season. Indexing of seed stocks by sprouting the tubers in moss toward the close of winter is recommended as a means of control of this disease.—*F. Weiss.*

5289. ELZE, D. L. Insect-transmission of "curl" diseases of potato. Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 35. H. Veenman & Sons: Wageningen, 1923.—Studies are in progress on the identification of insects feeding on potatoes, infection experiments with these insects as disease carriers, and on the biology of disease-transmitting insects.—*F. Weiss.*

5290. GILBERT, ALFRED H. Correlation of foliage degeneration diseases of the Irish potato with variations of the tuber and sprout. Jour. Agric. Res. 25: 255-266. 6 pl. 1923.—In the varieties of potatoes studied—Green Mountain, Irish Cobbler, and Enormous No. 9—spindliness of sprout was correlated consistently with leafroll whereas net necrosis of the phloem necrosis type was correlated with spindliness of sprout and with leafroll. The necrosis symptoms are not persistent in the progeny tubers. Yields of plants from spindling-sprout tubers were much reduced in comparison with those of plants from tubers with normal sprouts, and plants exhibiting "extreme" leafroll yielded far less than those with mild leafroll symptoms. Tubers with apparently normal sprouts produced mosaic progeny. In greenhouse experiments there was marked retardation in the germination of seed pieces both from mosaic and leafroll tubers. Numerous cases were observed in which mild mosaic plants produced mild mosaic progeny, and others in which plants with the "extreme" symptoms were followed the next year by plants with the same degree or form of infection. This suggests the hypothesis that there may be distinct and persistent strains of mosaic infection characterized by the several types of foliage symptoms. Studies in the matter of apical dominance in the sprout-

ing of both mosaic and healthy tubers showed no correlations either between dominance and healthy tubers or lack of dominance and mosaic tubers.—*Author*.

5291. GRAM, E. **Potato leaf-roll influenced by the origin of the tubers.** Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. *P.* 38-39. H. Veenman & Sons: Wageningen, 1923.—In an experiment on the effect of weather on the prevalence of leaf-roll it was found that the disease is much reduced following a season in which May and June are cool and moist.—*F. Weiss*.

5292. MCKINNEY, H. H. **Investigations of the rosette disease of wheat and its control.** Jour. Agric. Res. 23: 771-800. 8 pl., 2 fig. 1923.—The investigations show that the rosette disease is different from take-all and other footrot diseases which occur in Australasia, Europe, and U. S. A. The rosette disease has recurred every year in the experimental fields since it was discovered in 1919. The disease does not occur in an appreciable amount when wheat plants are grown out of the natural growing season or under ordinary greenhouse conditions. The origin of the disease is unknown. The malady is known to occur in Illinois and Indiana. As high as 98% reduction in grain crop has occurred in small areas and it is not uncommon to find a 40% loss in infested fields sown to susceptible varieties. The disease may cause a spotting in affected fields or it may be distributed rather generally. Such spots or patches occur independently of any particular soil type or topographic condition in the field. The most constant plant symptoms consist of: (1) arrested spring development, (2) excessive tillering which results in a rosette appearance, and (3) dark blue-green color of the foliage in combination with (1) and (2). These symptoms do not manifest themselves until early spring. Under favorable conditions diseased plants frequently show a marked tendency to recover and produce a fair crop, which comes on much later than the healthy crop. The rosette disease behaves in many ways similar to the Fiji, Sereh, and mosaic diseases of sugar cane and to the mosaic disease of corn. A typical mosaic mottling is associated with rosette, but it is not confined to these plants. The cause of rosette is unknown. It is known to be transmitted by the soil. Infection is prevented by sterilizing the soil with formaldehyde and also with steam. All experimental work indicates that the disease is caused by an organism or a virus. Studies have shown that several of the more common wheat insects are not the cause. Cell inclusions resembling those associated with certain of the virus diseases of plants and of animals are associated with rosette and the leaf-mottled condition. The rosette disease is controlled through the use of resistant varieties. Only 6% of the 150 varieties and selections of winter wheat used in experiments have shown definite susceptibility. It is not definitely known whether rosette occurs among spring varieties; symptoms somewhat similar to rosette have been noted, but these differ in certain particulars from those of rosette.—*Author*.

5293. McWHORTER, FRANK P. **The mosaic situation.** Philippine Agric. 12: 93-95. 1923.—A summary is given of several recent articles on mosaic diseases.—*Sam F. Trelease*.

5294. OORTWIJN BOTJES, J. **The potato-selection-farm at Oostwold.** Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. *P.* 142-147. H. Veenman & Sons: Wageningen, 1923.—This is an account of the methods employed at this farm in growing stocks selected for trueness to type and freedom from disease for the experimental study of degeneration diseases carried on at Wageningen. The procedure is governed by 3 principles—hill selection, harvesting in immature condition, and isolation. The advantage of immature seed is attributed to escaping the mosaic infection since the seed is harvested before aphids become numerous.—*F. Weiss*.

5295. QUANJER, H. M. **General remarks on potato diseases of the curl type.** Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. *P.* 23-28, 4 col. pl. H. Veenman & Sons: Wageningen, 1923.—The terms Krauselkrankheit and dwarf of earlier authors have been used for designating diseases which are now distinguished as leafroll, crinkle, stipple streak, and different kinds of mosaic. Progress in the investigation of these diseases depends on the segregation of pure lines of each of them, and also of healthy plants for comparison and inoculation. Although aphids play a role in field dissemination, transmission by grafting has been the most useful method in effecting artificial infection and distinguishing the symptoms in different varieties. Since primary symptoms are slight, infection experiments must be continued through the vegetative progeny of inoculated plants. The infective principle is

believed to spread through the sieve tubes because only insects which insert their proboscides into the phloem tissues are able to transmit these diseases. The etiological relation of various organisms hypothesized for these diseases can only be established after the isolation of such organisms in pure culture and proof of their pathogenicity. Overwintering of the disease-producing factor seems to take place only in living organisms—plants or insects. All these diseases are nearly coextensive with potato culture, and can be controlled only by seed selection and the propagation of healthy plants in isolated seed plots. Leafroll, marginal leafroll, intervenal mosaic, aucuba mosaic, common mosaic, crinkle, stipple streak, and leaf-drop streak are described and illustrated.—*F. Weiss.*

5296. SCHULTZ, E. S., AND DONALD FOLSOM. **Transmission, variation, and control of certain degeneration diseases of Irish potatoes.** Jour. Agric. Res. 25: 43-118. 15 pl. 1923.—Because of the absence of known causes, degeneration diseases of potatoes are considered as symptom aggregates. Seven are described and compared as observed in the Green Mountain variety. Mild mosaic was transmitted by means of stem grafts, tuber grafts, leaf-mutilation inoculation, and aphids. Leaf-mutilation inoculation was more effective with repetition and in insect cages, greenhouse, or damp chamber. Leafrolling mosaic and rugose mosaic were transmitted by means of leaf-mutilation inoculation and aphids. Streak was transmitted by means of leaf-mutilation inoculation; leafroll, not by this method, but by grafts and aphids; and the spindling-tuber disease, by the 4 methods effective for mild mosaic. Unmottled curly-dwarf was transmitted by leaf-mutilation inoculation and aphids; likewise, several combinations of diseases including mottled curly-dwarf, consisting of leafrolling mosaic and spindling-tuber together. The aphids used were *Myzus Persicae* Sulz. and *Macrosiphum solanifolii* Ashmead. Aphids usually transmit a combination but sometimes transmit only 1 disease of a combination. Much of the transmission was intervarietal, and disclosed varietal modification of symptoms. Rugose mosaic and leafrolling mosaic do not produce mottling in infected Rurals, or in certain other varieties. Root and leaf contact did not transmit mild mosaic and leafroll. Mild mosaic was not transmitted by flea beetles (*Epitrix cucumeris* Harris) nor by Colorado potato beetles (*Leptinotarsa decemlineata* Say.). Leafroll may induce net necrosis in certain varieties. Streak symptoms are changed greatly after tuber perpetuation. One or 2 individual aphids transmitted mosaic to small plants. Capillary glass tubes were slightly effective with mild mosaic, rugose mosaic, and streak, but negative results followed the immersion of a split stem in juice from mild mosaic plants. Tomato was infected with tobacco mosaic, and with 2 types of potato mosaic, but tobacco and potato did not exchange mosaic. Common nightshade (*Solanum nigrum* L.) accepted potato mosaic. Results of yield-rate tests for several years are tabulated. Prevalence as shown by a survey is stated. Ten days usually was an insufficient period for the translocation of the causal agent from inoculated leaves to the tubers. Certain environmental conditions modify the symptoms. Better control has been obtained by means of selection and isolation of bulk stocks than by means of tuber selection, hill selection, removal of diseased hills, and attempts at insect control. Potato degeneration or running-out is a disease problem, complex enough to require local study in different regions. The rate of spread varies with the region.—*Donald Folsom.*

5297. SMITH, KENNETH M. **Some peculiar pathological conditions in the leaves of potatoes affected with mosaic disease.** Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 30. H. Veenman & Sons: Wageningen, 1923.—This is an account of a demonstration consisting of microtome sections of potato leaves to show the presence of a peculiar type of vacuolated body occurring in cells of the chlorotic tissue, and the occurrence of nucleolar extrusion in similar areas. No conclusion as to the significance of these conditions is offered.—*F. Weiss.*

5298. WEBB, R. W., C. E. LEIGHTY, G. H. DUNGAN, AND J. B. KENDRICK. **Varietal resistance in winter wheat to the rosette disease.** Jour. Agric. Res. 26: 261-270. 1923.—Data from experiments in 1921-22 in southern Illinois and in northern Indiana on uniformly infested soil and involving over 200 varieties and selections of winter wheat from all parts of the U. S. A. show that the rosette disease of wheat can be controlled effectively by the use of resistant varieties and selections. The varieties which show a high degree of susceptibility represent only 4% of the total number of varieties tested and may be enumerated as follows: "Brunswick," Nigger, Penquite (Velvet Chaff), Missouri Bluestem, Harvest Queen, Selection

from Indiana Swamp, Fultz (Kentucky Agricultural Experiment Station), Miller's Pride, and Illini Chief. Harvest Queen (known also as Red Cross and Salzer's Prizetaker) proved most susceptible. Certain varieties, representing 6% of the entire series, showed infection percentages ranging from 1 to 5% and others, also representing 6% of the entire series, developed the disease to an extent of less than 0.5%. The remaining varieties proved either highly resistant or immune. The presence of flag smut in southern Illinois and in the same locality with rosette is a complicating factor and it is, therefore, important to develop a variety resistant to both diseases.—*R. W. Webb.*

5299. WERNER, H. O., AND R. F. HOWARD. **Seed potato investigations.** Nebraska Agric. Exp. Sta. Res. Bull. 24. 58 p., 23 fig. 1923.—In a study to determine the effect of culture, place, disease, and other factors upon the seed value of potatoes, the authors reached the following conclusions: Tuber line studies, with numerous lots of different varieties, revealed early and late maturing strains as well as a type of degeneracy very similar to, or identical with, the spindle tuber disease recently described by Shultz and Folsom. This degeneracy which has been studied in 10 varieties, manifests itself by a stiff, upright habit of growth and by an elongation of the tubers. Strains affected by it never recover and become progressively weaker. The degeneracy most common in western Nebraska is perpetuated through the tubers and appears to be transmitted from plant to plant in the field. Irrigation produces conditions more conducive than dry land culture to the rapid increase of this degeneracy, the percentage of degeneracy increasing and the yield decreasing with each additional year of irrigation. Many lots from isolated fields in the newer dry land potato-growing sections are relatively free from this degeneracy. This type of degeneracy causes very serious decrease in tuber yields until eventually no marketable tubers are produced. When planted in comparative trials seed stocks produced on dry land at the highest altitude proved superior in quality and yield of tubers produced.—*T. A. Kiesselbach.*

5300. WHITEHEAD, I. **Transmission of leaf-roll of potatoes in N. Wales during 1921.** Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 147-149. 2 diagr. H. Veenman & Sons: Wageningen, 1923.—Experiments were carried out in 1921 and 1922, in which leaf-roll-infected and healthy potatoes were planted in adjacent rows, or alternately in the same row. In some cases the roots of the healthy plants were protected from intermingling with those of the diseased ones by slate plates extending 4 inches below the level of the seed piece. Transmission of leaf-roll did not occur in rows of plants so protected but took place only along the row. In both cases the foliage intermingled but no aphids were observed. The effect of infection was not evident in the yield during the 1st year, i.e., the plants continued to synthesize and translocate normally, and it is concluded that only the subterranean parts were affected. The suggestion is offered that transmission occurs in nature both aurally by means of insects, and through the soil by some means not understood.—*F. Weiss.*

PARASITIC PHANEROGAMS

5301. MEINECKE, E. P. **Mistletoe.** [Rev. of: TUBEUF, KARL VON. *Monographie der Mistel.* xii + 832 p. R. Oldenbourg: Munich & Berlin, 1923 (see Bot. Absts. 12, Entry 6694).] Ecology 5: 106. 1924. [See also Bot. Absts. 13, Entries 258, 4401.]

NON PARASITIC DISEASES

5302. BARKER, B. T. P., A. H. LEES, T. WALLACE, AND S. P. WILTSHIRE. **Leaf scorch on fruit trees.** Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta. 1921: 77-121. 1921.—In several plantations there developed in certain areas a browning of the foliage, affected leaves appearing to have their margins scorched as if by fire. Close examination generally showed that trees with such foliage were also stunted in growth. With nearly all such trees the roots seemed to be loose in the soil—at least the root growth was poor. Detailed descriptions are given concerning conditions in 11 such areas. Chemical and mechanical analyses of the surface soil and mechanical analyses of the sub-soils are given in each case. Controlled experiments on producing the injury artificially are reported: in some, nutrients were used in excessive concentrations or were omitted; in others the roots were injured in various ways;

and in still others the stem was ringed or the leaf mid-ribs cut. Ringing caused scorching in the case of a Jefferson plum tree, though cutting mid-ribs did not. Lack of potassium in the soil seemed to reduce root growth and to encourage the injury. While the results are not entirely conclusive, the author thinks it probable that the injury is generally caused by an inadequate water supply to the leaves during times of high transpiration.—*W. H. Chandler.*

5303. BROOKS, CHARLES, J. S. COOLEY, AND D. F. FISHER. **Oiled wrappers, oils and waxes in the control of apple scald.** Jour. Agric. Res. 26: 513-536. 1923 [1924].—In 63 out of the 67 commercial storage tests reported, oiled wrappers either entirely prevented the development of scald or reduced it to a degree that made it negligible from the commercial standpoint. Unoiled wrappers had no effect upon scald and paraffin wrappers reduced the disease about $\frac{1}{2}$ as much as the mineral-oil wrappers. Wrappers carrying less than 15% of oil (about 0.28 gm. per wrapper) were found inefficient and unsatisfactory. Oiled blotter material scattered through the barrel reduced scald to about $\frac{1}{3}$ the amount found in untreated barrels. Oils and waxes applied to the apple skin gave fair scald control in some instances but often prevented normal coloring of the apples and otherwise affected their appearance. The conclusion is drawn that the checking of the changes from green to yellow in the skin of the apple is due to the oil actually deposited on the apple, and that the extent of scald control is determined largely by the amount of oil in close proximity to the skin but not necessarily deposited on it. Apple scald conditions develop in the apple tissues beyond remedy several weeks before scald becomes evident.—*Charles Brooks.*

5304. COOK, MEL. T. **Foliage injuries.** Ann. Rept. New Jersey Agric. Exp. Sta. 42: 475. 1920/21 [1922].—Pruning out 25% of the branches of shade trees in the fall, an application of fertilizer in the spring and loosening the soil around the tree are measures recommended for the control of leaf scald of shade trees.—*Wm. H. Martin.*

5305. HUDIG, J. **Diseases of crops on alkaline and sour soils.** Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 136-142. H. Veenman & Sons: Wageningen, 1923.—The soil diseases discussed occur chiefly on sand and peat soils. The Dutch oat disease, evidenced by greenish gray spots with cracks, may be treated by using acid fertilizers. Soil reaction is, however, not the cause but the principal factor. The use of acid manures and manganese sulphate is recommended. The black peat disease causes chlorosis and wilting of oats and rye and can be remedied by the use of town-refuse and debris.—*Harry Braun.*

5306. RAVAZ, L., ET G. VERGE. **Le rougeau de la vigne.** [The reddening of grape.] Compt. Rend. Acad. Sci. Paris 177: 1237-1238. 1923.—In some cases there is an occasional reddening of foliage and branches due to wounding either by man or by insects. In other cases there is a more general reddening which is not attributable to mechanical injury. This latter is traceable to poorly aerated soil. Starch and sugar are found to be present in the leaves in excess. The trouble is relieved by aerating the soil and by drainage.—*C. H. Farr.*

5307. SMITH, C. M. **Excretions from leaves as a factor in arsenical injury to plants.** Jour. Agric. Res. 26: 191-194. 1923.—Commercial calcium arsenate conforming to all present standards occasionally causes severe foliage injury when dusted upon cotton plants for the control of the cotton boll weevil. The only explanation suggested was "peculiar atmospheric conditions." It has now been found that the dew which forms upon Upland cotton plants is in general alkaline to phenolphthalein, and contains mineral salts to the extent of about 1,000 parts per million. These salts are mainly calcium and magnesium bicarbonates, and are probably taken up from the plant by osmosis. Such salts are capable of decomposing some commercial calcium arsenates with the liberation of considerable soluble arsenic, 1 experiment with the dew itself showing 8.7% soluble As_2O_5 in a sample which gave only 0.08% with distilled water. These facts suggest that the reaction of dew with arsenical sprays or dusts may at times be the cause of foliage injury, not only to cotton plants but to others as well.—*Author.*

5308. WELLENSIEK, S. J. **Premature tuber-formation in early potato varieties.** Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 34-35. H. Veenman & Sons: Wageningen, 1923.—Early potatoes frequently fail to appear above ground in Holland even in the absence of parasitic infection, secondary tubers instead of sprouts being formed. Storage of tubers at 9-13°C. leads to rapid sprouting; if several crops of such sprouts are

removed from the seed before planting, secondary tuber formation is likely to occur, especially if low temperatures (3–9°C.) prevail after planting. This occurs also in seed tubers which ripen prematurely due to dry weather before harvest. Keeping the fields moist during the ripening of seed potatoes and storage at low temperature, as near 0°C. as possible, serve to minimize this difficulty.—*F. Weiss.*

DISEASES OF UNKNOWN CAUSE

5309. LEES, A. H. Red plant disease of strawberries. Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta. 1921: 65–66. 1921.—A description is given of the behavior of strawberry plants in areas of certain fields where the plants become weak by the end of the 1st year and very weak during the 2nd. Very few roots start from the 2nd-year crowns. The plants generally die during the 3rd year if they survive the 2nd. The cause of the trouble is not known.—*W. H. Chandler.*

5310. LEES, A. H. The association of black currant mite (*Eriophyes ribis*) with reversion disease. Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta. 1921: 58–61. 1921.—There is an opinion among some growers of black currants that there is a close association between reversion and infestation by the currant mite. A statistical study with a considerable number of plants is reported. Reverted bushes were found generally to be attacked by the mite, but a considerable percentage of them was free. Bushes rather strongly attacked by the mite were always reverted. Mite attacks in the 1st year caused an increased amount of reversion in the 2nd.—*W. H. Chandler.*

5311. LEES, A. H. The influence of reversion (Nettle Leaf) on successful black currant growing. Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta. 1921: 62–64. 1921.—Information is given for nurserymen and others as to roguing methods to prevent the dissemination of the reversion disease.—*W. H. Chandler.*

GENERAL AND MISCELLANEOUS PATHOLOGICAL LITERATURE

5312. BARKER, B. T. P., AND T. WALLACE. A new method of sulphur fumigation. Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta. 1921: 122–124. 1921.—This is a report concerning efforts to disseminate very finely divided sulphur into green-houses. Crude methods used by growers consist in coating the hot water pipes with sulphur or exposing shallow pans of flowers of sulphur in the greenhouse. In a market device used, the sulphur is boiled under such conditions that dense clouds of solid particles are evolved. The amount of sulphur in the room can thus be regulated. However, since the boiling point of sulphur is above the ignition point, it is not always possible to avoid the dissemination of SO₂. It was found that by passing currents of air through melted sulphur below the ignition point, dissemination was very satisfactory and the danger of having SO₂ formed was eliminated.—*W. H. Chandler.*

5313. ERIKSSON, J. European phytopathologic collaboration. Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 205–214. H. Veenman & Sons: Wageningen, 1923.—International collaboration is possible through professional inspection, and control by determining the principles for preventing disease spread. An international institute for phytopathological researches in Europe is desirable. A list of literature on historical phases of the question is appended.—*Harry Braun.*

5314. FABRICIUS. [Rev. of: (1) LINDAU, G. (editor), UND E. RIEHM. Die pflanzlichen Parasiten. [Diseases caused by vegetable parasites.] Vol. 2, Pt. I. viii + 382 p., 50 fig. 1921; (2) LINDAU, G. (editor), UND E. KÖHLER, R. LAUBERT, W. WOLLENWEBER, UND H. ZILLIG. Vol. 3, Pt. II. vi + 310 p., 55 fig. 1923. (Vols. 2–3 of GRAEBNER, PAUL, G. LINDAU, UND L. REH (editors). Handbuch der Pflanzenkrankheiten begründet von Paul Sorauer. [Handbook of plant diseases by Paul Sorauer.] Paul Parey: Berlin.] Forstwiss. Centralbl. 45: 476–479. 1923.—Several statements or omissions regarding forest tree diseases are criticised, particularly the statement that the blister rust of *Pinus strobus* and *P. monticola* can be controlled by eradicating *Ribes*. The reviewer considers the greatest hope to lie in maintaining the stands in such condition as to allow free air movement. He also insists that silviculture itself is the most efficacious means of combating forest fungous diseases in general. [See also Bot. Absts. 12, Entries 6595, 2050, 2051; 13, Entry 1977.]—*W. N. Sparhawk.*

5315. FAVRE, M., ET OTA. Note sur une levure cutanée pathogène. [A yeast pathogenic on the skin.] Compt. Rend. Soc. Biol. 88: 222-224. 6 fig. 1922.—The morphological, physiological, and pathological characters are given of a yeast causing dermatosis. The organism is not named.—*Oran Raber*.

5316. GIBSON, A. Remarks on plant disease legislation in Canada. Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 107-110. H. Veenman & Sons: Wageningen, 1923.—Canadian regulations require inspection certificate, prohibit entry of European potatoes, and all 5-leaved species of *Pinus*, all currants, gooseberries, *Berberis*, *Pseudotsuga*, *Tsuga*, and *Larix* from Europe except that the last 3 may enter when originating in the U. S. A.—*Harry Braun*.

5317. GRAM, E. How do we receive and keep phytopathological information? Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 51-53. H. Veenman & Sons: Wageningen, 1923.—Present needs are (1) an improved exchange of original publications, (2) a more centralized abstract service, and (3) a series of annual or biennial progress reports by experts in various sections of phytopathology. It is also suggested that abstracts of publications be included before appearance of the full papers.—*Harry Braun*.

5318. GÜSSOW, H. T. International plant disease legislation as viewed by a scientific officer of an importing country. Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 96-105. H. Veenman & Sons: Wageningen, 1923.—The importation of many plant parasites on the North American continent has necessitated close legislative coöperation by Canada and the U. S. A. The damage caused by such importations has rendered strict quarantines imperative and justifies the severity of regulations which have caused complaints by European exporters. Certification by European exporters is not considered a real and permanent protection to importers on another continent. The problem may be partly solved by the assumption on the part of the exporting country of full responsibility for its exports, for efficacy of inspection service, and for the consequences of rejected shipments.—*Harry Braun*.

5319. GÜSSOW, H. T. The aims and organization of the plant pathological service of the Dominion of Canada. Internat. Rev. Sci. and Pract. Agric. N. S. 1: 595-599. 1923.—To solve plant pathological problems under the extreme climatic conditions of the Dominion of Canada, 11 points of observation have been established with headquarters in the office of the Dominion Botanist at the Central Experimental Farm at Ottawa, Ontario. The branch stations mentioned are: Charlottetown, Prince Edward Island; Fredericton, New Brunswick; Ste. Anne de la Pocatière, Quebec; Kentville, Nova Scotia; St. Catharines, Ontario; Summerland, British Columbia; Winnipeg and Brandon, Manitoba; Indian Head and Saskatoon, Saskatchewan. These stations deal with local problems. The plan is similar to that outlined at the International Conference on Phytopathology held at Rome in 1914.—*James E. Chapman*.

5320. HOWARD, L. O. International coöperation in combating insect pests and plant diseases. Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 36-38. H. Veenman & Sons: Wageningen, 1923.—The international aspect of the problems involved is emphasized, especially as regards the necessity and ultimate benefit of plant quarantine. The necessity of coöperation between entomologists and plant pathologists is particularly evident in cases of insect vectors of plant diseases. General sessions for bringing together these 2 groups of workers in matters of common interest are suggested.—*Harry Braun*.

5321. JACZEWSKI, A. DE. Essai de classification des phénomènes pathologiques chez les végétaux. [A classification of pathological phenomena in plants.] Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 244-251. H. Veenman & Sons: Wageningen, 1923.—A detailed classification is offered, based on (1) the presence of foreign bodies on the plant surface, (2) progressive modifications of the tissues, (3) regressive modifications (hypoplasia), (4) aspect modifications without tissue changes in volume or form.—*Harry Braun*.

5322. JACZEWSKI, A. DE. Résumé historique du développement de la phytopathologie en Russie. [Historical resumé of the development of phytopathology in Russia.] Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 238-243. H. Veenman & Sons: Wageningen, 1923.—Woronin was the founder of plant pathological work in Russia. Rostovzev gave the first courses in this subject at the Agronomy Institute near Moscow. The history and pur-

poses of the various mycological and phytopathological institutes and services are detailed.—*Harry Braun.*

5323. KIELSTRA, J. C. **Remarks on the economical questions connected with plant disease legislation.** Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 113-115. H. Veenman & Sons: Wageningen, 1923.—Imports of plants should be impeded as little as possible, otherwise financial loss to the importing country is certain.—*Harry Braun.*

5324. KÖCK, G. **Die Bewertung der Saatkartoffeln vom pflanzenschutzlichen Standpunkt.** [Evaluation of seed potatoes from the standpoint of plant protection.] Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 43-47. H. Veenman & Sons: Wageningen, 1923.—This is a discussion of the principles of potato seed improvement through the selection and certification of disease-free seed.—*F. Weiss.*

5325. McLAINE, LEONARD S. **New regulations under the Destructive Insect and Pest Act.** Agric. Gaz. Canada 11: 20-23. 1924.—Historical items in regard to insect and pest control in Canada are discussed. On September 1, 1923, after 2 years of investigation, an act regulating import and export inspection of plants and plant products went into effect. A list of 21 restrictions, administered by the Department of Agriculture, is given.—*James E. Chapman.*

5326. MARTIN, WILLIAM H. **Report of potato-spraying tests.** Ann. Rept. New Jersey Agric. Exp. Sta. 42: 435-441. 1920/21 [1922].—In a comparison of 5-5-50 and 4-4-50 Bordeaux mixture, the former gave better control of early blight and tip burn than the latter. The average yield of plots receiving 5 applications of 5-5-50 Bordeaux mixture was 281.4 bushels per acre as compared with 273.1 bushels for those receiving 3 late applications, 240.3 bushels for those receiving 3 early applications, and 259.4 bushels for the unsprayed plots. In tests with late crop Irish Cobblers, the yield of unsprayed plots was 163.9 bushels as compared with 175.2 and 199.3 bushels for plots sprayed with arsenate of lead and 5-5-50 Bordeaux mixture respectively. Spraying the American Giant variety with Bordeaux mixture resulted in an increase of 27.6 bushels over adjoining unsprayed plants.—*Wm. H. Martin.*

5327. NAUMOV, A. **Moyens d'évaluation des dommages causés par les parasites cryptogames.** [Methods of determining the damage caused by cryptogamic parasites.] Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 251-257. H. Veenman & Sons: Wageningen, 1923.—This is a general discussion and criticism of methods in present usage. The intensity of the attack is really a composite of (1) the percentage of plants attacked, (2) the frequency of attack on the susceptible parts, and (3) the degree of injury. Formulas for determining these factors are derived.—*Harry Braun.*

5328. NOWELL, WM. **Diseases of crop-plants in the Lesser Antilles.** xix + 383 p., 1 col. pl., 153 fig. The West India Committee: London, 1923.—In the 1st part of the book diseases are treated from the standpoint of cause under the following headings: diseases caused by fungi, diseases caused by bacteria, diseases caused by infective viruses, phanerogamic parasites, diseases due to nematodes, the relation of insects to plant diseases, non-parasitic diseases and entomogenous fungi. This is followed by a discussion of prevention and control including general considerations, fungicides and their application, wood-rots (treatment of trees), control of damping off, prevention of fruit rots and plant disease legislation.—Part II deals with: Section I, general diseases including root, stem, and leaf diseases; Section II, diseases of permanent crops including cacao, coconut, lime and other citrus trees, citrus trees in general, coffee, *Hevea*, and minor fruits; Section III, diseases of arable crops including banana, corn and sorghum, cotton, sugar-cane, root crops, leguminous plants, minor fruit plants, and diseases of plants not classified.—*Lillian C. Cash.*

5329. POETEREN, N. VAN. **Organization and methods of the phytopathological service of Holland.** Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 86-96. H. Veenman & Sons: Wageningen, 1923.—The primary purpose of this service is the spread of knowledge gained by research, so that it can be immediately put into practice. The 2nd is the control of plants and produce destined for export. The service is divided into 6 sections: (1) investigation and information, (2) propaganda for fighting diseases in horticulture, (3) propaganda for fighting diseases in agriculture, (4) ornithology, (5) execution of legal measures, and (6) exhibitions, museums, and collections. The 1st is centralized at Wageningen

and includes field work. The 2nd and 3rd include direct propaganda as well as giving solicited information, and are accompanied by field demonstrations. The 4th includes research on and protection of insect-eating birds. Regulatory laws are available only against American gooseberry mildew and potato wart disease. The former disease is now practically under control. The latter is being attacked from the standpoint of immune varieties. Disinfection and health of export plant shipments are under thorough supervision by inspectors.—*Harry Braun*.

5330. POOLE, R. F. **Investigation of horse-radish root rots.** Ann. Rept. New Jersey Agric. Exp. Sta. 42: 464-465. 1920/21 [1922].—Root rot was found on 4 farms in amounts varying from 5.9 to 21.3%. Applications of lime and sulphur did not control the disease. Careful selection of seed roots before planting and disinfection in corrosive sublimate or formaldehyde is recommended as a control measure.—*Wm. H. Martin*.

5331. POOLE, R. F. **Investigation of sweet potato diseases.** Ann. Rept. New Jersey Agric. Exp. Sta. 42: 466-468. 1920/21 [1922].—Plants from seed carefully selected in the field and again before being bedded showed an average of 10.4% stem rot as compared with 14.3% in plants from seed selected by the grower and 51% in plants from unselected seed.—*Wm. H. Martin*.

5332. POOLE, R. F. **Report of spraying test at Campbells' Soup farms.** Ann. Rept. New Jersey Agric. Exp. Sta. 42: 463. 1920/21 [1922].—In spraying tests with tomatoes, the average yield of unsprayed plots was 6,249 pounds as compared with 8,305 and 7,208 pounds for plots sprayed with 4-4-50 Bordeaux mixture and Bordeaux soap mixture, respectively.—*Wm. H. Martin*.

5333. REDWAY, JACQUES W. **Disease carriers: biological and geographical.** Ecology 4: 335-340. 1923.—Under biological carriers the team work of the rat and flea is emphasized, and under geographical carriers the wind, ships, and railway trains are discussed.—*Herbert C. Hanson*.

5334. REH, L. **Ist Trennung der Phytopathologie in praktische Botanik und praktische Zoo- (Entomo-) logie erwünscht? [Is differentiation of phytopathology into practical botany and practical zoo- (entomo-)logy desirable?]** Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 48-50. H. Veenman & Sons: Wageningen, 1923.—The only practical divisions of phytopathological study are on the basis of causal agents: (1) physiological, (2) plant parasites, and (3) animal parasites. The last 2 are separated by the use of entirely different methods and principles of study. Differentiation between botanists and zoologists is therefore necessary and leads to the best results when the highest specialization in research is followed in each science.—*Harry Braun*.

5335. RUSSELL, E. T. **The effects of partial sterilization of the soil.** Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 233-238. H. Veenman & Sons: Wageningen, 1923.—Formalin is very effective against soil fungi but does not destroy nematodes. Cresol is effective against the latter but not against fungi. Heat is a more general agent but is expensive. Increased productivity is the usual result of partial sterilization. The causes are partly chemical (direct increase of ammonia and soluble matter) and partly biological (simplification of the soil population). The latter leads to permanent increase in number of bacteria and to increase in nitrate production.—*Harry Braun*.

5336. SHEAR, C. L. **International phytopathology.** Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 53-58. H. Veenman & Sons: Wageningen, 1923.—“Phytopathological problems are world problems,” and as such require effective coöperation in all countries. Conclusions drawn from the study of any phytopathological problem in a single locality or country are necessarily inadequate and should be rounded out by a knowledge of conditions elsewhere. Coöperation may be attained in the following ways: by (1) a more general exchange of publications between individuals and institutions, (2) a more general exchange of specimens of parasites and loans of rare specimens and authentic material of little known species, (3) exchange or purchase of pure cultures (since this can hardly be a self-supporting project, it should be supported by government or private aid), and (4) formulation and adoption of uniform methods of collecting and handling plant disease data in different countries. All these apply equally well to economic entomology. Development of more

accurate methods of estimating crop damages are necessary. The International Institute of Agriculture at Rome is suggested as a clearing house for results of plant disease surveys and other phytopathological data from various countries, if sufficient funds can be rendered available. More frequent international meetings and international exchanges of students and professors are desirable.—*Harry Braun*.

5337. VERHOEVEN, W. B. L. Results obtained with some new seed-disinfectants. Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 120-121. H. Veenman & Sons: Wageningen, 1923.—Germisan is best for stripe disease of barley when used at the rate of 100 gm. in 3 l. of water per hectolitre of seed.—*Harry Braun*.

5338. WEBER, G. F. Field work in Florida during the year on disease control. Florida State Plant Bd. Quart. Bull. 8: 1-8. 1923.—Measures for control of citrus canker (*Bacterium Citri* (Hasse) Jehle) have been vigorously continued and disease is becoming less common.—Cantaloupes have been dusted with copper-lime dust and sprayed with Bordeaux mixture to control *Pseudoperonospora cubensis* (B. & C.) Rost. and *Colletotrichum lagenarium* (Pers.) Ell. & Hals. Both fungicides gave considerable control.—The most recent disease of celery is pink root, apparently caused by *Fusarium* sp., reported from Manatee County.—Blackheart is still a destructive disease of celery. It is believed to be the result of some peculiar physiological condition existing in the soil.—*Cercospora Apii* Fr. on celery is common everywhere and was very destructive until liquid Bordeaux mixture became generally used. Plants are sprayed in the seed bed soon after they are up, and spraying is continued throughout the season.—A species of *Pythium* seems to cause a wilt in certain palms, especially in *Cocos nucifera*, *C. plumosa*, and *Washingtonia robusta*.—*Pseudoperonospora cubensis* caused severe loss in the crop of cucumbers. Liquid Bordeaux mixture was applied in certain districts with practically no success; in other sections the spray was satisfactory.—*Bacterium lachrymans* E. F. S. & Bryan on cucumbers was practically controlled with Bordeaux mixture. A strain of the eggplant resistant to *Phomopsis verans* is being developed.—Sugar cane in the western part of Florida is still infested by mosaic; the Japanese sugar cane Cuyana 10 is recommended as being immune.—*J. C. Th. Uphof*.

5339. WERY, W. A. F. International trade and the task of the phytopathologist. Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 216-220. H. Veenman & Sons: Wageningen, 1923.—The task of the phytopathologist is to control plant diseases without hindering trade. Good regulations should require certificates of health with every shipment, the right to control shipments at port of destination, and exclusion of such plants or plant products as have been scientifically ascertained to be bearers of disease new to or not widely spread in the importing country.—*Harry Braun*.

5340. WESTERDIJK, JOHANNA. The "Centraalbureau voor Schimmelcultures." [Central Bureau for Fungus Cultures.] Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 165-169. H. Veenman & Sons: Wageningen, 1923.—The Bureau has existed since 1904 and came under the direction of the writer in 1907. Cultures of 1,200 types are now available. Methods used in keeping cultures are described. Rice, cereal kernels, stems and twigs are often more advantageous than agars and gelatins. Cherry decoction with agar is a very good medium for parasites. Plant decoctions are in general far better than synthetic media. Constant changing of the medium is necessary. Fungi in general require light which may influence many characteristics, particularly fruiting. Temperature changes often induce fruiting. Virulence is often dependent on morphological normality; both change with continued culture. Regeneration is possible by constant transfers to different media. Coöperation by sending cultures of newly described species is urgently requested.—*Harry Braun*.

PHARMACOGNOSY AND PHARMACEUTICAL BOTANY

HEBER W. YOUNGKEN, *Editor*E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 4820, 4830, 4866, 4968, 4988, 5119, 5170, 5384, 5393, 5394, 5400, 5432, 5433, 5434, 5435, 5466)

5341. BIRNSTIEL, WALTER R. Vergleichende Anatomie der Cinnamomumrinden unter besonderer Berücksichtigung ihrer Entwicklungsgeschichte. [Comparative anatomy of cinnamon barks with particular consideration of their developmental history.] 104 p., with plates. R. Noske: Leipzig, 1922.

5342. BLAQUE, GEORGES. Les plantes à thymol. [Thymol-containing plants.] 77 p., 5 pl. L. Declume: Lons-le-Saunier, 1923.

5343. BLAY PIGRAU, ANDRÉS. La yerba-mate [maté]. 25 p. Talleres Gráficos del Estado: Asuncion, 1918.

5344. CHEVALIER, J., ET E. DANTONY. Action toxique du principe insecticide des fleurs de pyrèthre. [Toxic action of the insecticidal principle of pyrethrum flowers.] Compt. Rend. Acad. Sci. Paris 177: 1077-1079. 1923.

5345. ECKLES, C. H., C. P. FITCH, AND J. L. SEAL. Molds in silage and their significance in the production of disease among live stock. Jour. Amer. Vet. Med. Assoc. 64: 716-722. 1924.—An account is given of the experimental feeding to horses, sheep and cattle of moldy silage and of pure cultures of certain molds. Neither the moldy silage nor the pure cultures produced any injurious effects. Although the authors grant that others have some evidence that molds may be dangerous at times, they express their belief that this rarely happens, and that the "feeder need not hesitate to utilize silage which contains some mold, especially when fed to cattle."—C. D. Marsh.

5346. HERBERT, D. A. Note on the poisoning of fowls by *Passiflora foetida*. Philippine Agric. 12: 96. 1923.—A number of fowls died after eating *P. foetida*; analysis of the plants showed a high HCN content.—Sam F. Trelease.

5347. JULIANO, J. B. Additional cyanophoric plants of the Makiling region. Philippine Agric. 11: 231-232. 1923.—A list is given of 30 species belonging to 19 genera which gave positive reactions for HCN by the Guignard test.—Sam F. Trelease.

5348. MELLOR, ERNEST M. The countries our drugs come from. VI. India. Pharm. Jour. 110: 297-298, 337-340. Fig. 1-8. 1923.—The article deals with cinchona, opium, aconite, cannabis indica, datura, capsicum, wormseed (*Artemisia maritima*), cumin, turmeric, citronella, lemongrass oil, spikenard, cardamoms, ammoniacum, gamboge, jalap, henna, senna, aniseed, peppers, kino, rhubarb, castor-oil, attar of rose (not exported), cutch, gambir, bael fruit, sandalwood oil, nux-vomica, chiretta, tamarinds, ginger, etc., mention being made of the source, preparation, exportation, etc.—E. N. Gathercoal.

5349. MELLOR, ERNEST M. The countries our drugs come from. VII. Burma and Formosa. Pharm. Jour. 110: 584-585. 1923.—The article is devoted chiefly to the discussion of camphor obtained from Formosa.—E. N. Gathercoal.

5350. RAMSAY, A. A. Distillation of oil from Eucalyptus leaves. Agric. Gaz. New South Wales 35: 140. 1924.

5351. ROTHLIN, E. Sur l'action physiologique de l'ergotamine, principe actif de l'ergot de Seigle. [Physiological action of ergotamine, the active principle in rye ergot.] Compt. Rend. Soc. Biol. 88: 470-472. 1923.—The author states the effects of ergotamine on the uterus, blood pressure, the heart beat, respiration, and the sympathetic system.—Oran Raber.

5352. ROTHLIN, E. Sur l'action toxique de l'ergotamine, principe actif de l'ergot de Seigle. [Toxic action of ergotamine, the active principle in rye ergot.] Compt. Rend. Soc. Biol. 88: 472-473. 1923.—The author states that convulsive ergotism and gangrenous ergotism are both produced experimentally by ergotamine. He concludes that ergotamine is the active principle in ergot and that the 2 kinds of ergotism, convulsive and gangrenous, are of the same origin.—Oran Raber.

5353. SARTORY, A., ET L. MAIRE. Les accidents provoqués par l'*Amanita echinocephala* Vitt. [Accidents caused by *Amanita echinocephala*.] Compt. Rend. Soc. Biol. 88: 437-439.

1923.—Two cases of poisoning are reported; death did not result. The symptoms are compared with those produced by *Entoloma lividum*, which they much resemble.—*Oran Raber*.

5354. SCHWARTZE, ERICH W., AND CARL L. ALSBERG. Quantitative variation of gossypol and its relation to the oil content of cottonseed. Jour. Agric. Res. 25: 285-295. 3 fig. 1923.—Chemical analyses of authentic samples of many varieties of cottonseed performed by the authors' modification of the aniline gossypol method of Carruth revealed the following: (1) a high oil and a low protein (nitrogen) content was accompanied by a high gossypol content, and vice versa. (2) No varietal factors were discovered, the majority of variations being geographical, to which there were a few seasonal exceptions apparently climatic in nature. (3) The seed in order of their composition are as follows: Those from states West of Mississippi and Tennessee, least gossypol, least oil, and most protein (nitrogen); those from Alabama next, followed by those from the Atlantic Coast States, and those from Arizona and California least, with most gossypol, most oil, and least protein. The article is preliminary to others on the pharmacology of gossypol and the relation of the gossypol variation to the regional distribution of cottonseed poisoning in farm animals.—*Erich W. Schwartz*.

5355. SERRANO, CIRIACO B. Prussic acid in *Phaseolus lunatus* and other beans. Philippine Agric. 11: 163-175. 1923.—HCN content of a number of wild and cultivated varieties of *P. lunatus* L. was determined with the following results: ripe beans of wild variety, 0.060-0.240%; ripe beans of semi-wild variety, 0.049-0.055%; ripe beans of cultivated variety, 0.030%; unripe beans of wild variety, 0.030%; unripe beans of cultivated variety, 0.011%. There was a gradual loss of HCN in powdered beans exposed to room temperature and in whole beans in sunshine. Heating whole beans in a vacuum for 1 hour at 100°C. removed 76.7% of the HCN. About 95% of the HCN was removed by boiling in water for 2 hours; even after this treatment the beans contained enough poison to give them a bitter taste. Boiling for 2 hours in an acetic acid solution drove off the HCN completely. For use as food, the beans boiled in acetic acid may be treated with lime water, to remove the sour taste, and may then be washed thoroughly. HCN was not detected in the seed of *P. mungo*, *Vigna sinensis*, and *Psophocarpus tetragonolobus*.—*Sam F. Trelease*.

5356. SMITH, F. B., AND C. T. WHITE. On the occurrence of cyanophoric glucosides in the flowers of some Proteaceae. Proc. Roy. Soc. Queensland 32: 89-91. 1920.—Positive reactions for HCN were obtained from the flowers or parts of flowers of *Grevillea Banksii*, *G. robusta*, *Hakea saligna*, and *Lomatia silaifolia*. The death of flies and calves has been attributed to contact with and ingestion of flowers of *Lomatia silaifolia*.—*W. D. Francis*.

5357. SWAMI, RAO, R. Oleander, a poisonous plant. Jour. Madras Agric. Students Union 10: 12-14. 1922.—Cases of oleander poisoning already recorded are listed and an appeal is made to keep this ornamental shrub (*Nerium odorum*) away from human habitations, parks, and roadsides.—*P. S. Jivanna Rao*.

5358. VILLEGAS, VALENTE. The toxicity of ipil-ipil (*Leucaena glauca*). Philippine Agric. 11: 151-152. 1922.—A test verified the popular belief that feeding on leaves and seed of *L. glauca* causes horses' hair to fall out.—*Sam F. Trelease*.

PHYSIOLOGY

B. M. DUGGAR, *Editor*

W. J. ROBBINS, *Assistant Editor*

(See also in this issue Entries 4804, 4855, 4856, 4857, 4869, 4886, 4889, 4890, 5025, 5039, 5046, 5052, 5058, 5070, 5108, 5147, 5198, 5215, 5230, 5244, 5250, 5303, 5307, 5308, 5340, 5468, 5471, 5472, 5490, 5494)

GENERAL

5359. DONNAN, F. G. The secret of life. [Rev. of: JOHNSTONE, JAMES. The mechanism of life in relation to modern physical theory. xii + 248p. Edward Arnold & Co.: London, 1921.] Nature 112: 352-354. 1923.

PROTOPLASM, MOTILITY

5360. LAPICQUE, L., ET LIACRE DE SAINT-FIRMIN. Sur l'irritabilité des chromatophores de Spirogyres. [Irritability of the chromatophores of Spirogyra.] Compt. Rend. Soc. Biol. 88: 669-671. 1923.—If Spirogyra filaments are placed in tap water which is not renewed some of the cells lose their turgidity after a few days and the chloroplast balls up in the center of the cell around the nucleus. If healthy cells are placed in tap water or a physiological saline solution and the cell is burst open by pressure on the cover glass the chromatophores separate from the wall and swell very rapidly altering markedly their normal appearance. When placed in distilled water several hours the chromatophores ball up as described above. A similar condition but produced less rapidly results from transference to a physiological saline solution. No explanation of these phenomena is given.—*Oran Raber.*

5361. LOEW, O. Über eine labile Eiweissform und ihre Beziehung zum lebenden Protoplasma. II. [A labile form of protein and its relation to living protoplasm.] Biochem. Zeitschr. 143: 156-160. 1923.—Rabdoids, which appear in storage tissue of the bark of *Salix*, *Populus*, *Acer*, *Alnus*, *Betula* and *Paeonia*, after mechanical stimulation in *Drosera* tentacles, and after treatment with caffeine or antipyrine in *Spirogyra*, are considered to be composed of labile protein. This is coagulated by ether or chloroform vapor; rendered insoluble by HCN and concentrated salt solutions; forms insoluble compounds with bases, such as hydrazine, hydroxylamine and very dilute NH_3 , thereby losing its lability; combines loosely with caffeine and antipyrine to form labile compounds, and is very hygroscopic. The lability of aldehydes and especially of amino-aldehydes is emphasized.—*H. D. Hooker, Jr.*

DIFFUSION, PERMEABILITY, PHYSICO-CHEMICAL PHENOMENA

5362. BREAZEALE, JAMES F. Nutrition of plants considered as an electrical phenomenon. Jour. Agric. Res. 24: 41-54. 5 fig. 1923.—Experiments in water cultures with wheat seedlings indicate that a demand for mineral nutrients may be created within the tissues of the plant, or it may be augmented by withholding any of the essential elements, and it may be measured by chemical means. This demand may be carried over a relatively long period of time, and seems to be cumulative. There is a time factor involved in nutrition,—a plant does not necessarily absorb twice as much nutrient material in 2 hours as it does in 1 hour. The plant prepares compounds in one part of its system and transports them to other parts of its system. The demand for particular nutrients is not the same at different stages of growth. Under the conditions of these experiments, better plants were obtained by growing them in a nutrient solution half the time and in distilled water the other half. The ability of corn and kaffir seedlings to compete with each other for nutrient material, when placed in keen competition, was measured. There was no indication that kaffir plants were the more vigorous feeders. The demand for nutrients seems to originate in the tissues of the plant, and is probably carried to the absorbing root surface by means of unsaturated carbon compounds bearing plus or minus electric charges. These charges are probably neutralized in the root by the plus or minus charges of the ions existing in the nutrient solutions. The plant seems to absorb ions which are mobile, and probably move freely through the soil through certain distances. If this is the case, the plant is not necessarily dependent upon the soil grains that touch its roots, for nutrient material, but may feed at a distance from the source of supply.—*Author.*

5363. DIXON, H. H., AND N. G. BALL. On the extraction of sap from living leaves by means of compressed air. Sci. Proc. Roy. Dublin Soc. 17: 263-266. 1 fig. 1924.—Branches of *Tilia americana* and *Sambucus nigra* were enclosed in a strong cylinder with their cut ends projecting. Liquid was forced out by applying pressure up to 20 atmospheres by means of compressed air. The liquid was found to be completely, or almost completely, free from sugars whether tested in June, July, or September. After the leaf cells had been made permeable by exposure to toluene vapour, brownish sap was collected, which after inversion was found to contain 5% of sugar. It was demonstrated that a backward flow of water through the tracheae does not render the leaf cells permeable.—*W. R. G. Atkins.*

5364. MICHAELIS, L., UND T. NAKASHIMA. Eine weitere Methode zur Bestimmung des isoelektrischen Punktes von Eiweisskörpern und ihre Anwendung auf die Serumalbumine verschiedener Tiere. [A further method of determining the isoelectric point of protein and its application to serum albumin.] *Biochem. Zeitschr.* 143: 484-491. 1923.—The optimum H-ion concentration for precipitating proteins cannot be determined for proteins such as serum albumin and hemoglobin, which are not precipitated. Maximum precipitation occurs at the isoelectric point, but the isoelectric point of non-precipitating proteins must be determined in some other way. Flocculation of such proteins can be produced by adding another colloid. The optimum H-ion concentration for this lies between the isoelectric points of the 2 colloids and depends on their relative amounts. As the amount of one of the colloids is decreased, the optimum H-ion concentration for flocculation approaches the isoelectric point of the other colloid. By this method, using mixtures of mastic and gelatin, a correct determination of the isoelectric point of gelatin was made (pH 4.65). The isoelectric point of serum albumin was determined by using mixtures of mastic and serum albumin. Values of pH 4.65-4.68 were obtained.—*H. D. Hooker, Jr.*

5365. PICKERING, J. W., AND J. A. HEWITT. Studies on the coagulation of the blood. Part I. Some physico-chemical aspects of coagulation. *Biochem. Jour.* 15: 710-724. 1921.—No necessity exists for assuming the presence of such hypothetical substances as anti-thrombin, proantithrombin, antiprothrombin, antifibrinolysin, prothrombokinase or metathrombin but most of the recognized facts of blood coagulation are explicable as physical phenomena. Thus, when tissue extract is added to bird's blood in vitro, the rate of coagulation depends upon such physical conditions as speed of addition and temperature. It is suggested that the electrical charge of accelerators and inhibitors of blood coagulation may be quite important. Coagulation may be regarded as beginning as a chemical and physical process and ending as a chemical reaction giving rise to at least 2 products,—thrombin and fibrin.—*A. R. Davis.*

5366. POZERSKI, E., ET MAX LEVY. Sur l'excrétion de produits phosphorés par les microbes. Modifications de ce phénomène sous l'influence du formol. [The excretion of phosphorus products by microorganisms. Modifications of this phenomenon by formalin.] *Compt. Rend. Soc. Biol.* 88: 18-19. 1923.—Formalin stops the excretion of P by Shiga's bacillus and also kills the bacillus showing that excretion of P is a vital characteristic of the organism. [See also following entry.]—*Oran Raber.*

5367. POZERSKI, E., ET MAX LEVY. Sur l'excrétion de composés phosphorés par les microbes. Action du formol pendant les premières heures de contact. [The excretion of phosphorus compounds by microorganisms. Action of formalin during the first hours of contact.] *Compt. Rend. Soc. Biol.* 88: 259-260. 1923.—During the first hours of contact of an emulsion of Shiga's bacillus or of *Proteus vulgaris* with formalin, the reproduction of the organisms is very quickly stopped whereas the excretion of P products continues. Later this excretion ceases. [See also preceding entry.]—*Oran Raber.*

5368. ROBBINS, WILLIAM J. An isoelectric point for plant tissue and its significance. *Amer. Jour. Bot.* 10: 412-439. 6 fig. 1923.—Many investigators have found that when growth or some other physiological process is plotted against the H-ion concentration of the medium in which the plant is grown, a curve is produced showing 2 maxima, with a minimum between them. A similar curve is found when the swelling, osmotic pressure, viscosity, electrical conductivity and alcohol number of gelatin is plotted against the H-ion concentration of the the solution, the minimum being located at the isoelectric point of gelatin, pH 4.7. The author discusses the conception of an isoelectric point and suggests that the existence of such a point in living tissues may explain the double-maximum curves above mentioned. When thin discs of potato-tuber tissue about 1×15 mm. were soaked in buffer mixtures composed of H_3PO_4 and NaOH, secondary sodium citrate and NaOH, or potassium hydrogen phthalate and NaOH, the change in weight plotted against the H-ion concentration of the solutions, expressed as pH, produced a curve having a double maximum with a minimum between. This minimum was located in the vicinity of pH 6.0. Dead and living tissues showed the same minimum. When potato tissue was exposed to solutions of different H-ion concentration, it also responded to acid and basic dyes as though it had an isoelectric

point, and here again there was no marked difference between living and dead tissue. The conception that protoplasm acts as though it had an isoelectric point in the absorption of water and solutes will be of very great importance, if substantiated, because of its bearing on many of the physiological activities of plants.—*E.W. Sinnott.*

5369. WARBURG, ERIK J. Studies on carbonic acid compounds and hydrogen-ion activities in blood and salt solutions. *Biochem. Jour.* 16: 153-340. 1922.—This comprehensive article is concerned chiefly with the validity of the Henderson-Hasselbalch equation employed in determining H-ion concentration of the blood from the amount of its combined and dissolved carbonic acid. There is, however, much of interest for the plant physiologist, not only in the theoretical discussion of $\text{H}_2\text{CO}_3 - \text{HCO}_2$ equilibria, but also in certain secondary developments, especially that which deals with factors determining the partition of permeable ions between the blood corpuscles and the serum. The application of Donnan's equation to this latter point has been made and the distribution of bicarbonate and chlorine ions between blood cells and serum proved to be in accord with Donnan's theory. An extensive bibliography is appended.—*A. R. Davis.*

WATER RELATIONS

5370. SMITH, HUGH B. Stomatal behavior of plants in the greenhouse in winter. *Papers Michigan Acad. Sci.* 2: 109-117. 1923.—Observations were made in January and February, 1922, on cloudy and sunny days and under other conditions, of the time of opening and closing of stomata on plants growing in a greenhouse. The stomata were observed directly on artificially illuminated leaves which were not removed from the plant. Four species of ferns and 11 of herbaceous seed plants were studied. On a dark day the stomata of 9 species remained closed all day, and of 2 were open all day, and of the other 4 open in the forenoon and closed in the afternoon. On a bright day the stomata of all of the species were open in the forenoon, some closing early, others late in the afternoon. Observations from 6:30 p.m. to 1:30 a.m. showed all stomata closed. On a cloudy day which cleared in the middle of the afternoon the stomata on some plants were closed all day; on others they opened later than on a clear day; while on still others, they remained closed until late in the afternoon, opening after the sun came out.—*Ernst A Bessey.*

5371. URSPRUNG, A., UND C. HAYOZ. Zur Kenntnis der Saugkraft VI. Weitere Beiträge zur Saugkraft des normalen und abgeschnittenen Hederablattes. [Absorptive power of normal and detached leaves of *Hedera*.] *Ber. Deutsch. Bot. Ges.* 40: 368-373. 1922.—The authors, having found values for the absorptive power of leaves of *Hedera* equivalent to 0.96M cane sugar solution, supplement tables previously published by a table for the osmotic pressures in atmospheres at 30°C. for values between 0.83 and 0.96M cane sugar. The method used was a plasmolytic one (Ursprung and Blum, *Zur Methode der Saugkraftmessung*. *Ber. Deutsch. Bot. Ges.* 34: 525-539. 1916). It was found that the absorptive power for the normal leaf of *Hedera* was higher in the upper than in the lower epidermis; that in the palisade cells it increased with increasing distance of those cells from the midrib or main veins, varying between 12.1 and 32.1 atmospheres; and that in the parenchyma sheath it varied between 4.1 and 11.0 atmospheres, increasing from the base of the midrib to the tips of the fibro-vascular bundles. In the case of detached leaves, allowed to wilt under various conditions, in general the absorptive power increased continually from the beginning of wilting to the death of the leaf.—*W. E. Maneval.*

MINERAL NUTRIENTS AND SALT RELATIONS

5372. ATKINS, W. R. G. The phosphate content of fresh water and salt waters in its relationship to the growth of the algal plankton. *Jour. Marine Biol. Assoc. United Kingdom* 13: 119-150. 1923.—The PO_4 content of uncontaminated streams and fresh-water supplies examined was under 0.05 parts per million, reckoned as P_2O_5 . A pure culture of *Nitzschia Closterium* in sea-water, enriched with Miquel's solution, multiplied up to over 3 million per cc., when the PO_4 was exhausted. It was ascertained that 1.12 mgm., expressed as P_2O_5 , is required for the production of 1×10^9 diatoms during the early stage of the culture; 1 gm.

of P_2O_5 suffices for 9×10^{11} diatoms. The PO_4 content of sea-water falls, at 1 station, from a value of 0.036 mgm. per l. at the surface to 0 in July. The surface water is almost free of PO_4 from May to August. The deep water off the Norwegian coast acts as a reservoir of PO_4 , which, presumably, is depleted during the summer. The PO_4 of fresh-water ponds falls almost to 0 early in April, and continues low throughout the summer. As many as 30 million diatoms per l. were found in a fresh-water pond. It was estimated that each l. of sea-water could produce 26.8 million diatoms for a consumption of 0.03 mgm. of P_2O_5 . It was computed also that the column of water produces 1.4 kgm., wet weight, of algal plankton per square m. of sea.—*Marshall A. Howe*.

5373. ATKINS, W. R. G. The silica content of some natural waters and of culture media. Jour. Marine Biol. Assoc. United Kingdom 13: 151-159. 1923.—In studying the seasonal changes in algal plankton in relation to the supply of the constituents necessary for their growth, the author was led to seek the source of the silica used to form the valves of diatoms and to consider whether lack of silica might be a factor in limiting their multiplication. The question of whether the glass vessels in which water was stored during experiments might supply silica to the water was also investigated. There are indications of seasonal changes in the amount of silica in solution in fresh-water ponds, which cannot be explained by the mere dilution or concentration of the solutes in general; they appear to be due rather to the action of diatoms. It is also probable that the silica content of sea-water undergoes similar seasonal changes. The walls of resistance-glass vessels were found to give off no measurable amount of silica to distilled water, but boiling sea-water for 3 hours in such vessels increased the silica content of the water by 1.5-5.5 mgm. per l.—*Marshall A. Howe*.

5374. BARNETTE, R. MARLIN. The influence of volume upon the rate of change in the hydrogen-ion concentration of nutrient solutions in contact with plant roots and the effect of this change upon iron availability. Ann. Rept. New Jersey Agric. Exp. Sta. 42: 345-348. 1920/21 [1922].—Tottingham's 4-salt solution No. T. R. C₂ and the same solution with $(NH_4)_2SO_4$ substituted for KNO_3 in equivalent osmotic concentration were used in culture bottles of 250, 500, 1,000, and 2,000 cc. capacity. A single wheat plant was grown in each culture for a period of 36 days and the pH values of the solutions determined at $3\frac{1}{2}$ -day intervals. In the Tottingham solution, the H-ion concentration decreased rapidly in the 250 cc. culture and about the 20th day chlorosis appeared. In the larger cultures, the increase in H-ion concentration was progressively less rapid. In the modified solution, the H-ion concentration was increased during the first 3 weeks and then the direction of change was reversed, this reversal being progressively delayed with the larger volumes of nutrient solution. The decrease in H-ion concentration was followed by the appearance of a chlorotic condition in the plants. With both solutions the average total dry weights of the plants increased with an increase in the volume of solution. The average yield of the plants grown in the modified solution was constantly higher than that of plants grown in the Tottingham solution. This is believed to be due to the higher availability of iron in the former solution.—*Wm. H. Martin*.

5375. HOAGLAND, D. R. The effect of the plant on the reaction of the culture solution. California Agric. Exp. Sta. Tech. Paper 12. 16 p. 1923.—The changes in reaction of culture solutions induced by the growth of plants has an effect on the absorption of ions by the plants. There is a general tendency for the plant to change the reaction toward the neutral point, whether the initial reaction is acid or alkaline. Barley, peas, and cucumbers were grown in single salt solutions and observations made of the effect produced on the reaction. The acidity increased in the case of a number of salts, particularly $(NH_4)_2SO_4$ and NH_4Cl , K_2SO_4 and Na_2SO_4 , and KH_2PO_4 , whereas the H-ion concentrations of other salts were decreased. In the case of any NO_3 (except NH_4NO_3) the solution generally attains a reaction very close to neutrality. The importance of light and temperature, and the necessity for considering the part taken by CO_2 and by the HCO_3 ion, are pointed out. There is a brief general discussion of the relation between ion absorption and H-ion concentration.—*Margaret Buwens*.

5376. JONES, L. H. Some factors affecting the rate of change of hydrogen-ion concentration in nutrient solutions. Ann. Rept. New Jersey Agric. Exp. Sta. 42: 330-333. 1920/21 [1922].—(1) With each number of plants used in a given volume of nutrient solution the rate of change of the H-ion concentration decreased with an increase in the total osmotic-con-

centration of the solution. (2) With each number of plants grown in the nutrient solution having a given total osmotic-concentration value, the rate of change of the H-ion concentration decreased with each increase in the volume of the solution. (3) With each volume of nutrient solution and with each total osmotic concentration the rate of change of the H-ion concentration increased with each increase in the number of plants grown in the solution.—*Wm. H. Martin.*

5377. REED, H. S., AND A. R. C. HAAS. **Growth and composition of orange trees in sand and soil cultures.** Jour. Agric. Res. 24: 801-814. 5 pl. 1923.—The paper gives data obtained from trees grown under controlled conditions. The technic of the cultures is described in some detail. The trees made very satisfactory growth and were comparable with good orchard trees of the same age. The leaves, shoots, trunks, roots, and rootlets were separately analyzed, and their content of mineral constituents is reported. The ash of the orange tree is rich in K, Ca, and CO_3 . N was most abundant in leaves and rootlets. The Na content of the ash is small in comparison with that of K, and was abundant in the trunk and root. The percentage of Cl in the ash was usually less than 1.2, whereas those of PO_4 and SO_4 were considerably greater.—*H. S. Reed.*

5378. SHIVE, J. W., A. L. PRINCE, R. V. ALLISON, AND S. WAKABAYASHI. **The salt requirements of the soybean plant during the seedling phase.** Ann. Rept. New Jersey Agric. Exp. Sta. 42: 327-330. 1920-'21 [1922].—A brief summary is given of the main results of a study of the salt requirements of the soybean plant in solution cultures during the early stages of growth to the flowering period. Maximum production of tops and roots was found to be associated with lowest proportions of KH_2PO_4 and $\text{Ca}(\text{NO}_3)_2$, and with the highest proportions of MgSO_4 . Low yields of tops or roots were produced in cultures characterized by high proportions of $\text{Ca}(\text{NO}_3)_2$ and correspondingly low ones of MgSO_4 . KH_2PO_4 has much less influence on the production of either high or low yields than either of the other 2 salts.—*Wm. H. Martin.*

5379. WALLACE, T. **Pot experiments on the manuring of fruit crops.** Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta. 1921: 42-57. 1921.—This is a preliminary report of an experiment with apples grown in silver sand in unglazed pots and watered with nutrient solutions. One group received a complete nutrient solution, 1 a complete solution and an extra amount of Na_2SO_4 , and 1 rain water only. Other groups were watered with nutrient solutions from which, respectively, N, K, P, Ca, or Mg was omitted. The behavior of the trees of each group during the 1st summer after planting is described. Strawberries were used in an experiment in which there were the same groups as with the apples and in addition a group used to study the effect of leaching the sand every 2 weeks. The behavior of the plants in each group is described. N and P seemed to be essential for strawberry plants, but the omission of K, Ca, or Mg did not seem to restrict growth during the 1st season.—*W. H. Chandler.*

5380. WALLACE, T. **Pot experiment on the manurial value of certain radio-active residues in which the radio-activity is due to the presence of radio-thorium.** Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta. 1921: 145-150. 1921.—The view has been expressed that certain radio-active substances in fertilizer may stimulate plant growth and certain fertilizer companies have claimed added value for their commodity because of its radio-active residue content. In pot experiments with lettuce, mustard, and peas there was no evidence of any benefit from such material; and with the peas there was a suggestion that in the high concentrations used the material was toxic.—*W. H. Chandler.*

PHOTOSYNTHESIS

5381. ATKINS, W. R. G. **The hydrogen ion concentration of sea-water in its relation to photosynthetic changes.** Jour. Marine Biol. Assoc. United Kingdom 13: 93-118. 1923.—At all stations the pH values rose from the December and January figures to maxima in May and August, the former being the more marked. A well-defined minimum was observed in July. In the winter the water in Plymouth Sound was less alkaline than the sea-water, in summer the difference was diminished, and the gradient was even abolished or reversed very slightly. The pH maximum in May, 1921, corresponds with the maximum average number of hours of sunshine daily, rather than with the length of the day, which reaches its maximum

in June. In a general way, the pH maxima may be correlated with the diatom maxima in early summer and in autumn, but no quantitative results have as yet been obtained on this point.—*Marshall A. Howe.*

5382. FROMAGEOT, C. Sur les relations entre l'état physico-chimique et le fonctionnement du protoplasma: Photosynthèse et respiration. [Relation between physico-chemical state and functioning of protoplasm: photosynthesis and respiration.] Bull. Soc. Chim. Biol. 6: 169-180. 1924.—Rectangles of the thallus of *Uva lactuca*, 6.5×3.5 cm., were placed in seawater to which varying amounts of glycerin were added, care being taken to maintain the H-ion concentration of the seawater unchanged. The rate of liberation of O_2 in the light was reduced 40% by the addition of 5% glycerin, 70% by 10%, and inhibited by 15% or more. Pieces of thallus submerged in glycerin solutions for 15 minutes and then returned to seawater recovered the normal rate of O_2 release if the glycerin concentration had not exceeded 10%, recovered only partially when the concentration was 10-35% and failed to recover, absorbing O_2 instead at a constant rate, if the concentration exceeded 35%. In the studies of respiration, pieces of thallus were kept 12 hours in the dark and the rate of absorption of O_2 determined. The absorption rate was somewhat increased in 5% glycerin, falling off progressively with increasing concentrations. With pieces of thallus placed 15 minutes in glycerin of varying strength, then transferred to sea water in the dark, O_2 absorption increased with increase in the concentration up to 20%, then fell off progressively to 50%, becoming about $\frac{1}{2}$ normal for higher concentrations. In another series of experiments, seawater so concentrated or diluted as to give a considerable range in density was employed. Photosynthesis was maximum in amount in normal seawater and decreased with increased or decreased density. Short immersion in the various solutions followed by transfer to normal seawater was accompanied by return to practically normal photosynthetic rate. Respiration was unaffected by diluting the seawater but was somewhat reduced in very concentrated seawater. The author considers that the results, like those of Wurmser and Jacquot with heat (See Bot. Absts. 13, Entry 414), are due to alterations of viscosity.—*Joseph S. Caldwell.*

5383. JOHANSSON, NILS. Zur Kenntnis der Kohlensäureassimilation einiger Farne. [CO₂ assimilation of some ferns.] Svensk Bot. Tidskr. 17: 215-223. Fig. 1-2. 1923.—The relation between assimilation and light intensity was investigated in *Polypodium vulgare* L., *Eupteris aquilina* (L.) Newm., *Dryopteris austriaca* (Yacq.) Woynar, and *D. spinulosa* (Müll.) O. Ktze. The experiments were made in air of normal CO₂ content. *Polypodium vulgare* showed a typical shade-leaf curve and *Eupteris aquilina* a sun-leaf curve. *Dryopteris austriaca* showed, at lower light intensities, a curve similar to that of *Polypodium*. In 30% of the maximal day-light, however, the curve began to fall again, so that in 100% light the assimilation was but 6% of the assimilation in 30% light. *Dryopteris spinulosa* showed a similar phenomenon but the curve ran higher and did not begin to fall until at 60% light.—*O. Heilborn.*

5384. LLOYD, FRANCIS E. The fluorescent colors of plants. Science 59: 241-248. 1924.—After reviewing the history of the discovery and study of fluorescence in plants, including the use of the ultramicroscope and the fluorescent microscope, the author briefly describes the work of some students of plant pigments. Stern (1921) found chlorophyll to be fluorescent only when colloidal, a view apparently supported by the work of the author. By the use of reflected light and a dark field condenser, fluorescence is demonstrated in many living plants including bacteria, blue-green algae, green algae, desmids, and in the chloroplasts of higher plants. Only reflected fluorescent light comes to the eye or to a photographic plate, as was proved by the use of filters. At the same time a certain amount of structure may be observed. Chloroplasts are difficult to study and require mounting in special media such as a cane sugar solution. There is offered some evidence that some of the accessory pigments are not always confined to the chloroplast along with the chlorophyll. The latter is thought to be associated with lipid in the chloroplast. The water-soluble pigments may be found to be of much importance to the plant.—*C. J. Lyon.*

5385. SCHERTZ, F. M. The quantitative determination of carotin by means of the spectrophotometer and the colorimeter. Jour. Agric. Res. 26: 383-400. 5 fig. 1923 [1924].—The spectrophotometric method for determining carotin is described and graphs are given for determining the amount of carotin in solutions when the transmittancy is known. A study was

made of the spectral transmittancy of carotin using helium and mercury courses of light. The mercury line 435.8 was adopted as the best scale on the spectro-photometer for giving the most accurate results with carotin solutions. Solutions of the same concentration of carotin in alcohol and petroleum ether gave approximately the same transmittancies, whereas the transmittancy with ether as the solvent was a little less. The specific transmissive index (extinction coefficient) of carotin in alcohol and petroleum ether for the mercury line 435.8 was found to be 1.915; in ether, 1.990.—Quantitative determinations of carotin by means of the colorimeter and the spectrophotometer were compared; the colorimeter proved unsatisfactory because of the difficulty in matching the solutions, thus giving a greater percentage of error. The spectrophotometer gave excellent results both as to accuracy and ease of reading the instrument. In working with the spectrophotometer it is not necessary to prepare pure carotin as a standard or use any other standard, for the instrument itself is standardized in regard to carotin when the transmittancy of its solution is known. The transmittancies as measured depend upon the physical properties of the substances involved and not variability in light, physiological factors, or tint of solution, which so greatly affect the readings in any colorimeter; they are also independent of abnormalities of the observer's color vision.—*Author*.

METABOLISM (GENERAL)

5386. BEZSSONOFF, N. Sur la réaction proposée par Jendrassik (1923) pour caractériser la vitamine B et sur ses rapports avec la fonction phénol. [On Jendrassik's proposed reaction for the recognition of vitamin B and its relation to phenolic structure.] Bull. Soc. Chim. Biol. 6: 35-39. 1923.—Jendrassik (Jour. Biol. Chem. 57: 129. 1923) found the reduction of potassium ferricyanide in presence of FeCl_3 with formation of Prussian blue occurred with all substances containing vitamin B but not with those from which it is absent. He considered that vitamin B does not contain a phenol group since it gave neither Millon's nor Liebermann's reaction. Bezssonoff points out that these reactions are not given by all polyphenols and polyphenol derivatives, but that formation of Prussian blue occurs with all ortho- and parapolyphenols, as well as with morphine. Phosphotungstomolybdic acid, proposed by the author as a reagent for polyphenols and vitamin C (Bezssonoff, Biochem. Jour. 17: 420. 1923) also reacts with substances rich in vitamin B, indicating that this vitamin may be a phenol.—*Joseph S. Caldwell*.

5387. BRIDEL, MARC. Étude biochimique sur la composition du *Monotropa hypopitys* L.: 2e Mémoire. Obtention d'un nouveau glucoside à salicylate de méthyle, la monotropitine. [Isolation of a new glucoside yielding methyl salicylate, monotropitine from *Monotropa hypopitys*.] Bull. Soc. Chim. Biol. 5: 918-925. 1923.—Continuing previous work in which monotropeine was isolated from this plant [see Bot. Absts, 13, Entry 3838], the glucoside which yields methyl salicylate and which was considered by Bourquelot to be identical with gaultherine has been examined in detail. On acid hydrolysis it yields 1 molecule each of glucose and xylose, with methyl salicylate. In this and other respects it differs from both natural and synthetic gaultherine; hence is to be regarded as a previously unreported glucoside.—*Joseph S. Caldwell*.

5388. BRIDEL, M., ET J. CHARPENTIER. Sur la caractérisation biochimique du galactose dans un mélange renfermant galactose et arabinose. [Biochemical recognition of galactose in mixtures containing galactose and arabinose.] Bull. Soc. Chim. Biol. 6: 26-34. 1924.—Arabinose and galactose are frequently encountered together in the products of hydrolysis of pectins and gums; the determination of galactose in such mixtures is difficult. In a mixture of arabinose and galactose in 70% ethyl alcohol, emulsin converts galactose into *b*-ethylgalactoside to the extent of about 51% without affecting arabinose. The reaction is slow, occupying 3-4 months. The arabinose may then be removed by treatment with HCN in the presence of NH_3 , which converts it into an ammoniacal salt of *l*-gluconic acid, which may be precipitated with lead subacetate. The ethyl-galactoside may then be crystallized by evaporating the filtrate and treating with acetic acid.—*Joseph S. Caldwell*.

5389. CARRÉ, MARJORY H., AND DOROTHY HAYNES. The estimation of pectin as calcium pectate and the application of this method to the determination of the soluble pectin in apples. Biochem. Jour. 16: 60-69. 1922.—The authors hold that pectin can be precipitated as cal-

cium pectate and accurately determined as such, the precipitate closely corresponding in composition to the empirical formula $C_{17}H_{22}O_{16}Ca$. The method is applied to the determination of soluble pectin in apples. Data are given.—*A. R. Davis*.

5390. CHARPENTIER, J. Application du procédé biochimique de caractérisation du galactose à l'étude de la composition des pectines. [The application of biochemical methods to the characterization of galactose in the study of the composition of pectins.] *Compt. Rend. Acad. Sci. Paris* 177: 1057–1059. 1923.

5391. CHARPENTIER, J. Sur les pectines retirés du céleri-rave, des tubercules de *Stachys tubrifera* et de l'écorce d'orange amère. Application du procédé biochimique de caractérisation du galactose à l'étude de la composition de ces pectines. [The pectins of celery root, tubers of *Stachys tubrifera* and bitter orange peel. Application of the biochemical method for identifying galactose to the study of the composition of these pectins.] *Bull. Soc. Chim. Biol.* 6: 142–156. 1924.—The method of identifying galactose developed by Bridel and Charpentier [see *Bot. Absts.* 13, Entry 5388] is applied to pectin obtained from the material, previously extracted with boiling alcohol and dried, by autoclaving at 110°C. for two 2-hour periods with 10 volumes of water and precipitating the aqueous solution with acidulated alcohol. The dry pectin was then hydrolyzed with H_2SO_4 , and galactose was isolated from the products by conversion into the ethylgalactoside, which was obtained in crystalline form. The galactoside was hydrolyzed, giving free galactose, which was converted into mucic acid. The presence of galactose in the pectin molecule is therefore confirmed. The alcoholic extract of celery root contained mannite and saccharose.—*Joseph S. Caldwell*.

5392. DANIEL, LUCIEN. Nouvelles recherches sur la migration de l'inuline dans les greffes de Composées. [Migration of inulin through grafts of Compositae.] *Compt. Rend. Acad. Sci. Paris* 177: 1135–1137. 1923.—Grafts were made using stocks of Jerusalem artichoke with scions of 9 other Compositae (*Helianthus annuus*, *H. orgyalis*, *H. multiflorus*, *Madaria elegans*, *Ambrosia trifida*, *Rudbeckia laciniata*, *R. moschata*, *Heliopsis scabra*, *Silphium trifoliatum* used as olodibioses); 7 of these were also used as mesobioties with Jerusalem artichoke, grafted above and used as stock below (hyperbioses or surgreffes). The weight of the tubercles produced was in every case less than in ungrafted Jerusalem artichoke, which bore 4000–6000 gm. of tubercles. [See also following entry.]—*C. H. Farr*.

5393. DANIEL, LUCIAN, ET JEAN RIPERT. Recherches sur les variations du chimisme chez les plantes greffées. [Variations in the chemical composition of grafted plants.] *Compt. Rend. Acad. Sci. Paris* 177: 894–895. 1923.—Olodibioses of tansy and chrysanthemum, and hyperbioses of tomato and belladonna were studied. In the former the amount of the odoriferous principle of the epibiotic tansy was compared with that of controls at the time of blooming in the 2nd year. The % of odoriferous principle is nearly 50% greater in the grafted than in the control plants. The essences are further compared as to solubility in 70% alcohol, index of acidity, index of ether solubility, and index of saponification. The mesobiont, belladonna, nourished by the tomato, contains little or no alkaloid, though there is some in the cicatrix. (See also preceding entry.)—*C. H. Farr*.

5394. GHOSE, S. N. The examination of some Indian foodstuffs for their vitamin content. *Biochem. Jour.* 16: 35–41. 1922.

5395. GUSTAFSON, F. G. Studies on the hydrogen-ion concentration of plant juices. I. Preliminary studies on the changes in the hydrogen-ion concentration of plants during their development. *Papers Michigan Acad. Sci.* 2: 49–52. *Fig. 3.* 1923.—Electrometric determinations were made of the H-ion concentration of the expressed juice of macerated tops of bean plants of 3 varieties at different ages. As the plants approached maturity the acidity of the juice decreased.—*Ernst A. Bessey*.

5396. IWANOFF, N. N. Über die Anhäufung und Bildung des Harnstoffs in Champignons. [The accumulation and formation of urea in mushrooms.] *Biochem. Zeitschr.* 143: 62–74. 1923.—By artificial cultivation, the urea content of ripe mushrooms was increased to 13.19% of the dry weight. Processes occurred during the ripening of the sporophore that lead to amino nitrogen formation and thence to urea. Treatment with chloroform prevented urea accumulation. The high urea content is associated with the liberal N supplied by artificial culture. Oxidation processes and the presence of amino acids are considered essential for urea formation in mushrooms.—*H. D. Hooker, Jr.*

5397. KLEIN, G., UND K. PIRSCHKE. *Nachweis und Verbreitung der Phytosterine im Milchsaft.* [Determination and prevalence of phytosterols in latex.] *Biochem. Zeitschr.* 143: 457-472. 1923.—By saponification of the ether extract, materials inhibiting the crystallization of phytosterols were removed. With 1% alcoholic digitonin solution, a crystalline compound of phytosterol was obtained that could be detected microchemically. By this reaction euphorbone was shown to be a phytosterol. It was found in other plants than those belonging to the Euphorbiaceae. Euphorbone and other phytosterols were found by macrochemical methods in 18 species of various families, and by microchemical means in all (about 60 species) laticiferous plants investigated. Phytosterol is considered to be characteristic of latex in amounts ranging from 0.1 to 2%. Bromine and nitro derivatives were made. Latex is thought to have some physiological significance, perhaps in water storage.—*H. D. Hooker, Jr.*

5398. LOPEZ DOMINQUEZ, F. A. *Changes wrought in the grapefruit in the process of maturation.* *Jour. Porto Rico Dept. Agric.* 4: 5-101. 1920.—Chemical analyses and physical measurements of grapefruit covering a period of 3 years indicate that the obvious signs of maturity, such as color of fruits, condition of juice cells, taste of the juice, and general appearance, coincide with cessation in the increase of total fruit weight and juice weight, the decrease in the thickness of skin, the increase of ratio of solids to acids, and with the end of the process of sugar elaboration and the beginning of inversion of sucrose. When the fruit is still very green, the % of solids in solution, and the ratio of solids to acids are very high. With further development of the fruit the % of solids and the ratio decrease. When the process of maturation begins the ratio of solids-to-acids increases regularly again, due to the gradual decrease in the acid content until perfect maturity is reached. The author concludes from his data on 3 varieties that grapefruit in Porto Rico may not be considered mature and fit to be eaten before the ratio of solids to acids in the juice has reached at least 7. The sugars are formed toward the latter part of fruit development, and their elaboration ceases when maturity is attained. The fact that N, P_2O_5 , and K were present in higher proportion in green fruit than in ripe fruit, suggests that a very large proportion of the solids is formed in the earlier stages of the development of the fruit. It also appears that neither the kind of soil nor the kind of fertilizer has any significant influence on P_2O_5 and K content of the fruits.—*Geo. H. Dungan.*

5399. MACLEAN, IDA S. *The conditions influencing the formation of fat by the yeast cell.* *Biochem. Jour.* 16: 370-379. 1922.—Although fat exists free in yeast cells in small amount, increasing in old and degenerating cells, most of it is found in combination with the plasma and is not extractable by alcohol or ether. A free supply of O_2 and a non-nitrogenous medium rich in carbohydrates tend to increase the fat content of yeast, but such fats are held in combination and are not free. The fat and sterol so formed are derived from carbohydrates.—*A. R. Davis.*

5400. MARCHLEWSKI, L., ET Z. WEIVZCHOWSKI. *Recherches sur la vitamines I.* [Researches upon vitamins.] *Bull. Soc. Chim. Biol.* 6: 40-43. 1924.—Active antipolyneuritic preparations were made by prolonged extraction of wheat bran with boiling alcohol. More active preparations are obtained by extraction with acidulated water (1% HCl) at 45-50°C. and concentrating to a syrup at the same temperature under reduced pressure. Such a syrup was highly effective in curing polyneuritic pigeons. When such an extract, without concentrating, is neutralized with NH_3 to precipitate albumins, filtered, and precipitated with $AgNO_3$, a considerable precipitate is formed. This is redissolved with dilute HCl, filtered, evaporated in vacuo at 40°C., and redissolved in water. The preparation thus obtained contains the vitamin in relatively pure condition; its efficiency in the cure of polyneuritic pigeons is extraordinary. Equally effective preparations may be obtained by precipitating the aqueous solution with picric acid instead of $AgNO_3$, dissolving the picrate with dilute HCl, and removing it with ether.—*Joseph S. Caldwell.*

5401. MASUROVSKY, BENJAMIN. *A study of the effects of pumpkin seeds on the growth of rats.* *Jour. Agric. Res.* 27: 39-42. 2 fig. 1924.—A 7-weeks' feeding trial of *Cucurbita Pepo* seed was conducted with 6 rats of the same age and litter. The animals were arranged in 3 separate groups. Group 1 received a grain mixture constituting the basal balanced ration.

Group II received 50 parts of ground pumpkin seed to every 50 parts of the basal balanced grain mixture. Group III was fed on ground pumpkin seed only. The feeding was done ad libitum. The results obtained in the experiment suggest the following conclusions: (1) pumpkin seed fed in as high a quantity as 50% of the grain mixture show no injurious effects upon the growth of rats; (2) rats fed on pumpkin seed only exhibit poor growth; (3) a pronounced increase was noted in the daily gain per 100 gm. in body weight in Group II during the 1st week, this being 1.58 gm. greater than that of Group I, the control, and 1.83 gm. greater than the gain of Group III.—*Author*.

5402. MILLER, W. LASH. Wildiers' Bios. *Science* 59: 197-199. 1924.—In experiments on the nutrition of yeast it was found that a portion of wort was essential for growth, a fact first noted by Wildiers (1901-06) at Louvain. Quantitative study of the effect on the rate of reproduction of yeast cells of different amounts of wort has lead to the conclusion that the rates in all cases are the same until the "bios" supplied by the wort is exhausted. The work of G. H. W. Lucas has shown "bios" to be 2 substances, each with characteristic properties. Miss E. V. Eastcott has found wide distribution of both throughout the vegetable world, with a close association with vitamin B. Mention is made of the work of others leading to further purification and knowledge of the chemical relationships of these auximones.—*C. J. Lyon*.

5403. NICOLAS, E., ET G. NICOLAS. Nouvelles observations sur l'influence de l'hexaméthylènetétramine et de l'aldéhyde formique sur le haricot. [Influence of hexamethylenetetramine and of formaldehyde upon the bean.] *Compt. Rend. Acad. Sci. Paris* 177: 1062-1064. 1923.—Varying amounts of hexamethylenetetramine and formaldehyde were added to a nutrient solution and the effect on the number of roots and branches of the stem and on the leaf area of the bean noted. It is concluded that these 2 compounds function as foods and not as hormones.—*C. H. Farr*.

5404. ROAF, H. E. Urochrome as a derivative of chlorophyll. *Biochem. Jour.* 15: 687-688. 1921.—Green parts of plants increase the output of urochrome in the urine, whereas carotin does not. In view of the similarity of chlorophyll derivatives and urochrome, it seems probable that urochrome is a derivative of chlorophyll.—*A. R. Davis*.

5405. TUTIN, FRANK. The chemistry of the apple. *Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta.* 1921: 135. 1921.—Results are given of some analyses for fat; ether soluble product; material soluble only in alcohol; material soluble in water and in alcohol; and pectin.—*W. H. Chandler*.

5406. ULTÉE, A. J. Stearinsäure im Milchsafte von *Ficus fulva* Reinw. [Stearic acid in the latex of *Ficus fulva*.] *Bull. Jard. Bot. Buitenzorg* III, 5: 105-106. 1922.

5407. ULTÉE, A. J. Ueber eine Wachstumsart im Milchsafte von *Ficus alba* Reinw. [A wax-like substance in the latex of *Ficus alba*.] *Bull. Jard. Bot. Buitenzorg* III, 5: 241-243. 1922.

5408. ULTÉE, A. J. Stickstoffreiche Milchsäfte. [Latex rich in nitrogen.] *Bull. Jard. Bot. Buitenzorg* III, 5: 245-246. 1922.

5409. WRIGHT, O. K. The action of yeast growth stimulant. *Biochem. Jour.* 16: 137-142. 1922.—Experiments by the author indicate that "bios" does not act catalytically in the assimilation of $(\text{NH}_4)_2\text{SO}_4$, but that the yeast grows at the expense of this body until the organism reaches a certain concentration in the medium when growth and assimilation of N become independent of "bios."—*A. R. Davis*.

5410. WRIGHT, S. A study of the combined action of raw cow's milk and orange-juice as antiscorbutic substances. *Biochem. Jour.* 15: 695-702. 1921.

5411. ZILVA, S. S. Conditions of inactivation of the necessary food factors. *Biochem. Jour.* 16: 42-48. 1922.—The destructive influence of air and ozone on the antiscorbutic properties of cod-liver oil, and decitrated lemon juice was noted. The water-soluble factor in autolyzed yeast juice, on the other hand, was not appreciably inactivated. Ultraviolet light had no deleterious action on accessory food factors in the absence of air, nor did boiling destroy the antiscorbutic property of decitrated lemon juice in an atmosphere of CO_2 . Boiling in air markedly inactivated the latter.—*A. R. Davis*.

METABOLISM (NITROGEN RELATIONS)

5412. CHIBNALL, A. C. Investigations on the nitrogenous metabolism of higher plants. Part II. The distribution of nitrogen in the leaves of the runner bean. *Biochem. Jour.* 16: 344-362. Fig. 1. 1920.—*Phaseolus vulgaris* var. *multifloris* was grown on unmanured ground and samples were taken at 10 periods during the growing season, a relatively large number of plants being taken for each analysis. N distribution was determined in both water-soluble and insoluble fractions, the analyses covering the following N fractions: total N in solution, nitric N, ammonia N, amide N (asparagine and glutamine N), humin N (and N precipitated by phosphotungstic acid), monoamino N, proteose N, nitrous N, and "other" N (calculated by difference). The author notes results as follows: (1) Seasonal variations: total N and protein N vary with growth, decreasing when this is very rapid or pods are forming; distribution of N in colloidal protein remains practically unchanged throughout the series; asparagine and free NH_3 remain low; nitric N and monoamino N vary directly with protein N; water-soluble products show much variation, making a comparison of leaves from plants of different age impossible. (2) Diurnal variations; at night there is a diminution of total solids, total N, and protein N; nitric N rises while asparagine disappears. Other water-soluble products are more or less unchanged during the night. The diminution of proteins at night is held to indicate translocation of unchanged protein or its decomposition products. In addition to the effect of seasonal and diurnal conditions, certain starvation experiments were carried out. The conclusions are supported by extensive data.—A. R. Davis.

5413. GAINEX, P. L., AND H. W. BATCHELOR. Influence of the hydrogen-ion concentration on the growth and fixation of nitrogen by cultures of *Azotobacter*. *Jour. Agric. Res.* 24: 759-767. 1 fig. 1923.—Data are presented that point very definitely to a limiting H-ion concentration of pH 5.9-6.0 for the various cultures employed. Vigorous growth and N fixation took place at pH 6.1-6.5. Very slight, if any, changes in the reaction of the media were produced by the growth of the various strains of *Azotobacter* studied. The results agree very closely with findings in soil and tend to substantiate former conclusions that this group of organisms will not exist and function in soils the H-ion concentration of which is greater than pH 5.9-6.0.—P. L. Gainey.

5414. GALLAGHER, P. H. Estimation of nitric nitrogen and total nitrogen in plant tissue extracts. *Jour. Agric. Sci.* 13: 63-68. 1923.—Several methods for estimating NO_3 by reduction to ammonia in some of the more common vegetable roots were examined and the error involved in the use of acid reducing agents in the presence of amino groups is emphasized. A method based on the use of Devarda's alloy and magnesia is recommended, and directions for estimation are given.—W. Rei Robbins.

5415. PONDER, ERIC. The estimation of non-protein nitrogen in blood. *Biochem. Jour.* 16: 368-369. 1922.—A rapid micro-method for the estimation of non-protein N in the blood is described, which, with slight modification, could be adapted to determinations in plant tissue.—A. R. Davis.

5416. TERROINE, EMILE F., RENE WURMSER, ET J. MONTANE. Influence de la constitution des milieux nutritifs sur la composition de l'*Aspergillus niger*. [Influence of the constitution of the nutritive medium on the composition of *Aspergillus niger*.] *Bull. Soc. Chim. Biol.* 4: 623-643. 1922.—Continuing previous work this paper reports results of determinations by the Kjeldahl method of the nitrogen content of cultures of *Aspergillus niger* grown in a variety of culture media differing in nature and concentration in respect to sources of C and N. In studying the effect of stage of development upon N content, the authors assume that for cultures grown under identical conditions, the dry weight of mycelium is a better indication of the stage of development than is actual age. A series of cultures ranging in dry weight from 0.1 to 1.5 gm. show a clearly marked though somewhat irregular decrease in N content from 6.25% for cultures weighing less than 0.2 gm. to 5.36% for cultures weighing 1.07-1.42 gm. each. Alteration in the concentration of $(\text{NH}_4)_2\text{SO}_4$ as a source of N from 1 to 2 or 4% produced no change in the percentage of N in the mycelium; with 5 and 10% there was a slight decrease in dry weight of cultures and a slight increase in their N content. With 20% of saccharose in the medium, the N content of 5 cultures only slightly exceeded 3%;

with 4% it was approximately 7.8% for cultures weighing $2\frac{1}{2}$ to 3 gm., and decreased to about 4% for those weighing 1- $1\frac{1}{2}$ gm. The suggestion is made that when a superabundance of carbohydrate is available, the behavior of the fungus is analogous to that of higher animals under like conditions in that its protoplasmic composition remains unchanged while fats and carbohydrates are stored. Dextrose in a concentration of 30% gave cultures weighing about 1 gm., and averaging 4.5 % N. Peptone and urea in quantities so adjusted as to supply equivalent amounts of N were equally good sources of this element, the cultures making good growth and having an N content of 5.5-6%; those with NaNO_3 contained only about 5%, and those with guanidine only 2.7-3.9% N. Formation of conidia, usually postponed until exhaustion of the medium is well advanced, began very early when guanidine was used as a source of N. Growth was slower and the N content materially lower with galactose than with either arabinose or xylose as a source of C. In cultures in which N starvation was brought about by transfer to a culture solution containing no source of N, the N content fell 2.63%, in those deprived of both N and C it was decreased to 2.67%. This indicates that when starved the fungus consumes its nitrogenous material as does the fasting animal.—*Joseph S. Caldwell.*

5417. TOTTINGHAM, W. E. **Physiological stability in maize.** *Science* 59: 69-70. 1924.—The nitrogenous composition of maize is not modified by nutrient treatment nor by variation in climatic factors.—*C. J. Lyon.*

METABOLISM (ENZYMES, FERMENTATION)

5418. BLANC, JEAN. **Transformation de bacilles pyocyaniques en bacilles sans pigments. Essai d'interprétation.** [Transformation of bacilli producing pyocyanase to a form without pigment. An attempted explanation.] *Compt. Rend. Soc. Biol.* 88: 52-54. 1923.—Two strains of *B. pyocyaneus* were modified so as to lose their typical race characters, including power to produce pigment, proteolytic properties, and motility. These changes were induced by modifying the medium and then using the filtrate from these modified cultures. It is thought the bacteria were weakened by the sudden change of medium.—*Oran Raber.*

5419. EDSON, H. A. **Acid production by *Rhizopus Tritici* in decaying sweet potatoes.** *Jour. Agric. Res.* 25: 9-12. 1923.—The fermentation produced in sweet potatoes decaying through the action of *Rhizopus Tritici* is of the familiar alcohol-acetic acid type, in which, in addition to alcohol and acetic acid, much smaller amounts of formic, butyric, lactic, and succinic acids are formed, as well as acetone and an unidentified aldehyde. NH_3 is among the nitrogenous decomposition products.—*Author.*

5420. EFFRONT, JEAN. **Sur l'absorption de l'alcali, de l'acide organique, et des enzymes par les pulpes végétales.** [Absorption of alkali, organic acid, and enzymes by vegetable pulps.] *Compt. Rend. Soc. Biol.* 88: 129-132. 1923.—The pulps of vegetables, salad plants, and fruits absorb gastric juice, organic acids, alkalies, and pepsin. In general alkalies are absorbed more than acids. The absorption of acid by turnip pulp diminishes with the concentration. With pepsin and cauliflower pulp the reverse is true. In a medium containing both acid and pepsin an equilibrium between the 2 is automatically established. [See also following entry.]—*Oran Raber.*

5421. EFFRONT, JEAN. **Influence de la pulpe végétale sur les conditions chimiques du milieu et sur la coordination du travail des catalyseurs biochimiques.** [Influence of vegetable pulp on the chemical conditions of the medium and on coordination of the work of biochemical catalysers.] *Compt. Rend. Soc. Biol.* 88: 132-135. 1923.—The relative degrees of absorption of acids, alkalies, and enzymes determines the chemical reactions of the external medium and also determines the precedence of reactions where enzymes are concerned. [See also preceding entry.]—*Oran Raber.*

5422. FABRE, R., ET H. PENAU. **Recherches sur les ferments amyolytiques. I. Préparation d'un amidon standard.** [Researches on amylolytic ferments. I. Preparation of a standard starch.] *Bull. Soc. Chim. Biol.* 5: 897-910. 1923.—Starches from 6 varieties of potato showed very slight constant differences in the rate at which they are attacked by pancreatic diastase. Starches prepared by washing with distilled water are less readily attacked by pancreatic than those prepared by washing with filtered Seine water, while the action of

official diastase is greater upon the distilled water preparations. These results are due in part to the removal of salts from the starch by distilled water, in part to the differences in H-ion concentration of the Seine and distilled waters.—*Joseph S. Caldwell.*

5423. FABRE, R., ET H. PÉNAU. *Recherches sur les ferments amyolytiques. II. Sur le mode d'action des ferments amyolytiques du Codex.* [Researches on amyolytic ferments. The mode of action of the amyolytic ferments of the Codex.] *Bull. Soc. Chim. Biol.* 5: 911-917. 1923.—Potato starch prepared by the author's method [see preceding entry] was submitted to the action of malt diastase for 1 hour at 55°C. and the products of digestion compared with those obtained by the use of pancreatic diastase. Maltose is the sole product of the action of malt diastase; with pancreatic diastase there is 1 part of glucose to 18-20 parts maltose in the product.—*Joseph S. Caldwell.*

5424. HÄBL, H., UND H. SCHWEIGART. *Zur Kenntniss der Kartoffelamylase.* [Potato amylase.] *Biochem. Zeitschr.* 143: 516-526. 1923.—The chlorides of Na, Ca, K, Ba, and Mg activated potato amylase. The diastatic hydrolysis was delayed by salts of Zn, Cd, Pb, and Cu. Glycine, alanine and leucine also activated amylase. Salt-free amylase, prepared by dialysis and ultra filtration, was entirely inactive, no change occurring during 20 hours at 37°C. This preparation was activated by adding NaCl.—*H. D. Hooker, Jr.*

5425. HALEY, D. E., AND H. B. PIERCE. *A simple shaking apparatus for use in enzyme studies.* *Science* 59: 66-67. 1924.—Small glass flasks were attached to a revolving wheel within an incubator heated by a carbon lamp controlled by a thermoregulator. The wheel was revolved 60-70 revolutions per minute by a small electric motor.—*C. J. Lyon.*

5426. HÉRRISSEY, H., ET J. CHEYMOL. *Action synthétisante de la d-mannosidase en présence de quelques alcools monovalents.* [Synthetic action of d-mannosidase in the presence of various monovalent alcohols.] *Bull. Soc. Chim. Biol.* 6: 186-189. 1924.—Continuing work in which the senior author [see Bot. Absts. 13, Entry 3046] demonstrated the reversibility of the action of methyl-d-mannosidase, the authors tested the ability of the enzyme (in the form of dried and powdered germinated lucerne seed) to form mannosides from mannose in the presence of ethyl, normal propyl, isopropyl, or primary normal butyl alcohol. In every case a small amount of mannose disappeared when the mixtures were allowed to stand under toluol at room temperature for 105-159 days, as determined both by the polarimeter and by loss of reducing power. This is regarded as due to the formation of the corresponding mannosides, but by reason of the complexity of the mixtures no attempt was made to isolate them.—*Joseph S. Caldwell.*

5427. HEWITT, J. A., AND DOROTHY B. STEABEN. *Note on the fermentation of i-inositol.* *Biochem. Jour.* 15: 665-666. 1921.—Employing *Bacillus lactis aerogenes* as a fermenting organism, the authors found no clear evidence that lactic acid is one of the products of fermentation of i-inositol. Negative results were also obtained in an attempt to demonstrate glucose as an intermediate product in the breaking down of this compound.—*A. R. Davis.*

5428. KLEIN, G., UND A. LIMBERGER. *Zum Kreislauf des Schwefels im Boden.* [The sulphur cycle in the soil.] *Biochem. Zeitschr.* 143: 473-483. 1923.—Thiosulphate bacteria were cultured as aerobes on both organic and inorganic media. They were able to oxidize S, H₂S and its compounds, sulphites and hydrosulphites to SO₄ or polythionic acid. The S of cystine albumin, nuclein, and of meat extract was oxidized to S and SO₄. KNO₃ added to the medium was reduced to NO₂ and eventually to NH₃. When NH₄Cl was used as a source of N, NO₂ was produced. In all cases atomic S was secreted as drops or granules; or on agar as rhombic crystals. The presence of the bacteria in water, soil and air was established. The thiosulphate bacteria are thought to play an important rôle in converting organic S in the soil to SO₄.—*H. D. Hooker, Jr.*

5429. KRISHNAMURTHI RAO, K. *Colour of jaggery or gur.* *Jour. Madras Agric. Students Union* 10: 309-310. 1922.—The color of jaggery obtained from sugarcane depends on the tannins (polyphenols) and oxydases present in the canes and not on the color of the canes. Lime added at the time of boiling hardens the jaggery but spoils the color.—*P. S. Jivanna Rao.*

5430. LEMOIGNE, M. *Fermentation butylénéglycolique du glucose par certaines bactéries du groupe du Bacillus proteus.* [Butylglycol fermentation of glucose by certain bacteria of the B. proteus group.] *Compt. Rend. Soc. Biol.* 88: 467-468. 1923.—*B. proteus*, like many other

bacteria, causes glucose to undergo a butyglycol fermentation characterised by its 2 products, butyleneglycol and acetylmethylcarbinol.—*Oran Raber*.

5431. NEUBERG, C., UND E. REINFURTH. Eine neue Form der Umwandlung des Acetaldehyds durch gärende Hefe. VI. Mitteilung über Carboligase. [A new transformation of acetaldehyde produced by fermenting yeast.] *Biochem. Zeitschr.* 143: 553-565. 1923.—When acetaldehyde was added to fermenting yeast, optically active acetoïn or dimethyl ketol was formed. This product of acetaldehyde condensation which is not formed during normal sugar cleavage was obtained when sucrose, fructose or glucose was the sugar fermented. With bottom yeast or pure top yeast all the acetaldehyde added was converted to acetoïn. Baker's yeast gave a smaller yield. Acetoïn was also formed in cell-free enzyme preparations. It is thought that a part of the acetaldehyde which condenses to acetoïn is derived from the sugar fermented.—*H. D. Hooker, Jr.*

5432. NEUBERG, C., UND O. ROSENTHAL. Über die Cellase der Taka-diastrase. [The cellase of Taka diastase.] *Biochem. Zeitschr.* 143: 399-401. 1923.—In addition to amylase, phosphatase, lecithase and sulphatase, inulase and considerable cellase were found in Taka diastase. The latter is an enzyme that hydrolyses cellobiose to glucose. This activity was determined polarimetrically, and glucosazone was isolated from the solution.—*H. D. Hooker, Jr.*

5433. NOGUCHI, J. Über die Hexose-mono-Phosphatase der Taka-diastrase. [Hexose-mono-phosphatase in Taka diastase.] *Biochem. Zeitschr.* 143: 190-194. 1923.—An enzyme was found in Taka diastase that decomposes the salts of hexose-mono-phosphoric acid at 37°C. From the barium salt, barium phosphate was formed as a gel. The substrate was hydrolysed almost completely by the enzyme except when small amounts of enzyme were used.—*H. D. Hooker, Jr.*

5434. OTERO, MARIE J. Rôle de quelques stimulants sur l'activité fermentative de la levure. [The rôle of some stimulants on the fermenting activity of yeast.] *Compt. Rend. Soc. Biol.* 88: 375-376. 1923.—In extremely minute quantities nicotine and pyridine stimulate the growth of yeast. Their action seems to be catalytic.—*Oran Raber*.

5435. RHIND, D., AND F. E. SMITH. Note on tannase. *Biochem. Jour.* 16: 1-2. 1922.—The following method for determination of gallotannin was devised in connection with studies on the activity of tannase from *Aspergillus Luchuensis* Inui. Twenty-five cc. of the tannase-gallotannin mixture is withdrawn from the flask and 4 cc. added to 750 cc. of H₂O containing 20 cc. of indigo carmine in a procelain dish. This is titrated with 0.1% KMnO₄, which gives both tannins and non-tannins present. The remainder of the 25 cc. sample is shaken with 1 gm. of fat-free caseinogen for 15 minutes, and passed through a BaSO₄ filter. This process is repeated. When all gallotannin is removed, 4 cc. of the filtrate is titrated as before. The difference between the 2 readings represents the gallotannin present. The actual quantity may be calculated by means of Spier's ammonium oxalate-gallotannin ratio, viz., 1 gm. ammonium oxalate equals 0.4648 gm. gallotannin. Since indigo carmine reacts with KMnO₄, it is necessary to run a blank and subtract the result from the final titration values.—*A. R. Davis*.

5436. SEN, H. K. Über die carboxylatische Spaltung der Di-methyl-brenztraubensäure und die Herstellung der α -Keto-isovaleriansäure. [The decarboxylation of dimethyl pyroracemic acid and the synthesis of α -keto-isovaleric acid.] *Biochem. Zeitschr.* 143: 195-200. 1923.—Synthesized dimethyl-pyroracemic acid (α -keto isovaleric acid) was fermented by dried yeast to CO₂ and isobutyl aldehyde, the yield being 50% when alone or in the presence of phosphates. A 75% yield was obtained in the presence of NaHSO₃ or of sodium acetate.—*H. D. Hooker, Jr.*

5437. SMORODINZEW, I. A. Über die Wirkung des Histozyms auf die Homologen der Hippursäure. [Action of histozyme upon homologues of hippuric acid.] *Zeitschr. Physiol. Chem.* 124: 123-139. 1923.—Histozyme was prepared from organs of the dog, swine, cow and horse. The kidney, liver, spleen, lungs, heart and muscular skeleton of the dog, and the liver of the calf, ox and horse were found to have the ability to split hippuric acid. The activity of the enzyme was weak in proportion to the concentration but not less active than the juice of fresh organs. The enzyme was soluble in water and a mixture of water and glycerine. The enzyme did not split B-alanin, *d*-*l*-B benzoylamino butyric acid, benzoyl amino iso-butyric acid, and *l*-benzoyl amino butyric acid but did split *d*-benzoyl amino butyric acid and *l*-

benzoyl leucine to form benzoic acid. The author regards this as an illustration of the specification of an enzyme determined by the configuration of the molecule of the substrate. The enzyme splits glycocholic and taurocholic acids forming cholic acid. Apparently histozyme is the enzyme which splits off a fatty acid from butyryl glycine, butyryl alanine, lauryl glycine, lauryl alanine, and lauryl alanyl glycine.—*Henry R. Kraybill.*

5438. SMORODINZEW, I. A. Zur Lehre von den Reduktasen II Mitteilung Ein Vergleich des Einflusses der Alkalien auf die Reduktase der Kartoffel. [Influences of alkalies upon reductase of potatoes.] Zeitschr. Physiol. Chem. 124: 202-210. 1922.—All alkalies used retard the reduction of NO_3 by reductase. Concentrations of 0.004–0.02% are effective. The cations exert no noticeable effect. The effects noted are believed to be due to the OH ion since the alkali hydroxides are effective in lower concentrations than the carbonates. Very dilute solutions are without effect and in no case is any activation of the process observed.—*Henry R. Kraybill.*

5439. TUTIN, FRANK. The behavior of pectin towards alkalis and pectase. Univ. Bristol Ann. Rept. Agric. and Hort. Res. Sta. 1921: 130-134. 1921.—On treating pectin with NaOH, both acetone and methyl alcohol were formed. When the amount of alkali used was sufficient to react with only $\frac{1}{2}$ the pectin both acetone and methyl alcohol were obtained, apparently in the same relative proportions as when an excess of alkali had been used. Pectin was treated with pectase in the presence of chalk, chalk being used because the natural acid reaction of pectin retards the action of pectase. The products found were acetone, methyl alcohol and a gelatinous solid which consisted of calcium pectate. The author thinks that pectin is the dimethylisopropenyl ester of pectic acid. The pectin employed was obtained from apple pomace. Pectin from other sources such as carrots, turnips and mangold wurzels, was also studied briefly.—*W. H. Chandler.*

5440. VILLAROE, M. J. La vitamine B comme activateur des ferments. [Vitamin B as an activator of enzymes.] Compt. Rend. Soc. Biol. 88: 376-377. 1923.—Yeast extract rich in vitamin B increases the action of catalase extracted from the liver. The action of lipase from *Ricinus* and of amylase from Taka diastase is also increased. The vitamin probably acts as an activator of the enzyme.—*Oran Raber.*

5441. VINCENT, H. Bacille typhique et catalase. [The typhoid bacillus and catalase.] Compt. Rend. Soc. Biol. 88: 590-591. 1923.—An emulsion of *B. typhosus* grown on agar medium shows catalase activity. The catalase is produced in varying amounts. The various conditions under which the activity is most pronounced are given.—*Oran Raber.*

5442. VOSKRESSENSKY, A. Étude des variations du pouvoir diastasique de l'uréase du Soja hispida suivant l'âge des grains. [Variations with age of seed in the urease activity of *Soja hispida*.] Compt. Rend. Soc. Biol. 88: 498-500. 1923.—Ripe seed of the 1905 and 1919 crops and unripe seed of the 1922 crop had active enzyme. The urease of seed of the 1922 crop was about as active as that from the seed of the 1905 crop. The urease from the seed of the 1905 crop was almost as active as that from the seed of the 1919 crop.—*Oran Raber.*

METABOLISM (RESPIRATION, AERATION)

5443. ALLISON, R. V. The relation of aeration to the development of the soybean plant in artificial culture. Ann. Rept. New Jersey Agric. Exp. Sta. 42: 338-344. 1920/21 (1922).—A description is given of the apparatus used for the forcing of air through solution cultures. On the dry weight basis, lowest average yields were produced by sand cultures, only little more than $\frac{1}{2}$ that produced in solution cultures. Aerated solutions produced an average total yield more than double that of the sand and 13% higher than that of the solution culture. In drip solution cultures the yield was slightly higher than that from the aerated cultures but less than that of the drip sand cultures. The superiority of the average yield from the drip solution cultures was due not so much to the constant renewal of the solution as to the better aerated condition of the solution. The high yields obtained in the drip sand cultures are likewise attributed to more perfect aeration of the sand medium. In general, the % of total N was always slightly lower for the plants of the simple solution and simple sand cultures.—*Wm. H. Martin.*

5444. BURGE, W. E. Evidence that catalase is the enzyme in animals and plants principally responsible for oxidation. Trans. Illinois Acad. Sci. 13: 135-136. 1920.—It was found that in animals whatever increases oxidation stimulates the alimentary glands, particularly the liver, to an increased output of catalase; and whatever decreases oxidation produces a decrease in catalase production. This parallel relationship suggests that catalase may also be the enzyme in plants chiefly responsible for oxidation.—H. W. Anderson.

5445. HARDEN, A., AND F. R. HENLEY. The function of phosphates in the oxidation of glucose by hydrogen peroxide. Biochem. Jour. 16: 143-147. 1922.—Data are presented showing that glucose can be oxidized by H_2O_2 in the presence of the following buffers: $NaHCO_3 + CO_2$; $Na_2HASO_4 + NaH_2AsO_4$; $NaC_2H_3O_2$; $K_2HPO_4 + KH_2PO_4$, provided in all cases the pH of the system does not rise much above 7.3. From this the author concludes that the buffer effect of phosphate is the important consideration.—A. R. Davis.

5446. HERBERT, D. A. The gas in the coconut. Philippine Agric. 11: 177-179. 1923.—Gas appears in the fruit of *Cocos nucifera* after the endosperm is well developed. In young nuts 81.3 % of the gas was N_2 , 18.7% was O_2 . In old nuts the volume of gas was greater; 99.8% was N_2 ; 0.2%, O_2 . The O_2 is used in the utilization of fat by the embryo. The pressure present in the coconut is due to turgidity, not to the presence of the gas.—Sam F. Trelease.

ORGANISM AS A WHOLE

5447. HERBERT, D. A. Anaesthesia in plants. Philippine Agric. 11: 141-149. 1922.—Experimental support was obtained for Haberlandt's theory of transmission of stimulus in *Mimosa pudica*. In simple response produced by mechanical shock and properly controlled chemical stimuli, etc., the stimulus was too feeble for rapid conduction; but in injury due to the same and other agencies the stimulus was conducted rapidly. Leaves indirectly affected by a transmitted stimulus behaved like leaves which showed simple response. The rate of transmission and the duration of the effects of the stimulus were proportional to the amount of stimulus. Chloroform and ether did not narcotize *Mimosa*. Their effect was similar to that of more violent poisons, such as NH_3 , H_2S , and SO_2 , but differed in degree. Suitable concentrations of these substances produced simple response, but in excess they produced injury response. Anaesthesia was not produced in *Mimosa* by gases which produce this phenomenon in animals. In the presence of small amounts of these gases excitatory fall was first produced, but the leaf re-erected itself and the time taken was the same as that in the case of a simple stimulus. Where the effect was prolonged injury was produced and complete recovery did not take place.—Sam F. Trelease.

5448. MONTEMARTINI, LUIGI. Effetti della senilità delle piante. Nota preliminare. [Preliminary note on the effects of senility in plants.] Atti Ist. Bot. Univ. Pavia II, 18: 133-135. 1921.—Quantitative determinations are given of the amount of ash in leaves of young (3-15 years) and old (100-120 years) trees of *Platanus occidentalis*, *Aesculus hippocastanus* and *Abies pectinata*. The leaves were collected in the morning, were of similar light exposure, and occupied analogous positions on the branch. The results show a greater % of ash per unit of dry weight in the leaves of old trees.—P. D. Caldis.

5449. PERALTA, F. DE, AND R. P. ESTIOKO. A tentative study of the effect of root excretion of common paddy weeds upon crop production of lowland rice. Philippine Agric. 11: 205-216. 1923.—*Cyperus* spp. and water lily (*Monochoria hastata* (L.) Solms.) excreted substances beneficial to production of rice (*Oryza sativa* L.), but zacate (*Leersia hexandra* Sw.), the most common forage crop in the Philippines, gave off detrimental substances. Rice excreted a substance harmful to rice.—Sam F. Trelease.

5450. PUSCARIU, ELENA, ET I. NITZULESCU. Recherches expérimentales sur l'action de l'adrénaline sur le Pneumococque. [Action of adrenalin on *Pneumococcus*.] Compt. Rend. Soc. Biol. 88: 540-541. 1923.

5451. VIAL, J. Le nucléate de soude, milieu de culture. [Sodium nucleate as a culture medium.] Compt. Rend. Soc. Biol. 88: 209-211. 1923.—Sodium nucleate can be used as a culture medium for some forms of bacteria as well as for yeasts and molds but is of only mediocre value. Most forms grow better on agar and gelatine media.—Oran Raber.

GROWTH, DEVELOPMENT, REPRODUCTION

5452. RUDOLFS, WILLEM. Influence of temperature and initial weight of seeds upon the growth-rate of *Phaseolus vulgaris* seedlings. Jour. Agric. Res. 26: 537-539. 1923.—Bean seed of different sizes (weights) were selected and grown in darkness at constant relative air humidity (60%), and at constant temperatures of 5, 10, 15 and 20°C in soil with water at 60% of its water-holding capacity, until the seedlings stopped growing or collapsed. Robertson's equation, considering growth as an autocatalytic chemical reaction, was applied. Almost no growth occurred at 5°C.; the average growth of plants grown at 10°C. for all sizes of seed was about the same as the growth of plants at 15°C. for small seed. Plants from seed of a heavier weight showed decided advantage over those from seed of light initial weight. This advantage was maintained throughout the growth period and increased with time. The influence of temperature upon the growth curves is very pronounced, especially in the case of large seed.—*Author*.

5453. SCHMIDT, DAVID. Relation of seed weight to the rate of growth and size of crimson clover plants. Ann. Rept. New Jersey Agric. Exp. Sta. 42: 333-335. 1920-21 [1922].—In the germination of the seed and during the early development of the plants, the advantage was in favor of the heavier seed. The heaviest seed developed nearly all of the first foliage leaves before any appeared on the plants from the lightest seed and somewhat earlier than those on the medium weight seed. At all times during the 12-weeks' growth period, the average dry weight of the plants from the heavier seed was greater than that of the plants from the seed of lighter weight.—*Wm. H. Martin*.

MOVEMENTS OF GROWTH AND TURGOR CHANGES

5454. BALL, NIGEL G. Phototropic movements of leaves.—The functions of the lamina and the petiole with regard to the perception of the stimulus. Sci. Proc. Roy. Dublin Soc. 17: 281-286. 2 fig. 1924.—The petiole of *Oxalis macra* is strongly phototropic, but the power of response is lost 1-2 days after the removal of the leaf lamina. When a leaf of *Sparmannia africana* is shaded on one side of the midrib a slow bending of the petiole takes place, the movement being away from the shade and parallel to the surface of the leaf. The stimulus may be transmitted through 15 cm. of the petiole, near the base of which bending is greatest. The petiole is also phototropic, which enables the leaf to adjust itself when exposed to oblique illumination. The lamina can be expected to respond only to oblique illumination when, owing to curvature of its surface, the intensity of the light acting on it is not uniform.—*W. R. G. Atkins*.

5455. RICÔME, H. Intervention de la pesanteur dans le phototropisme. [The intervention of gravity in phototropism.] Compt. Rend. Acad. Sci. Paris 177: 1064-1066. 1923.—Stems of *Vicia faba* took a direction which was neither that of light (-8°) nor that of gravity ($+90^{\circ}$), but an intermediate direction. The reaction varies with the age of the plant and with the intensity of the light. It is concluded that gravity has a marked effect upon phototropic reactions. [See also Bot. Absts. 8, Entry 663.]—*C. H. Farr*.

GERMINATION, RENEWAL OF ACTIVITY

5456. JONES, EDITH SEYMOUR. Influence of temperature, moisture, and oxygen on the spore germination of *Ustilago Avenae*. Jour. Agric. Res. 24: 577-591. 3 fig. 1923.—Under controlled conditions the minimum temperature for the spore germination of *Ustilago Avenae* (Pers.) Jens. in beef broth pH 6.1 was found to be between 4 and 5°C.; the optimum in the same medium in 24 hours is 15-28°C.; and the maximum between 31 and 34°C. The critical temperatures for sporidial production are the same as for spore germination except that the maximum is between 29 and 30°C. By placing the spores on layers of agar between filter papers in soil containing 30, 60, and 80%, respectively, of its moisture-holding capacity germination was found to be highest at 30%, slightly less at 60%, and very much less at 80%. The spores failed to germinate in a beef broth suspension exposed to an O_2 -free atmosphere.—*Author*.

5457. JONES, EDITH SEYMOUR. Influence of temperature on the spore germination of *Ustilago Zeae*. Jour. Agric. Res. 24: 593-597. 1 fig. 1923.—In 27 combinations of soil and manure germination of *Ustilago Zeae* (Beckm.) Unger occurred in only 3 instances. For this reason Pasteur's solution was used. Under controlled conditions the optimum temperature for spore germination and sporidial production was found to lie between 26 and 34° and the maximum between 36 and 38°C. Germination and sporidial production occurred at 8°C. This effect of temperature upon the fungus indicates that infection may be favored by hot weather whether the germination takes place in the soil or in water held upon the host plant.—*Author*.

TEMPERATURE RELATIONS

5458. HARVEY, R. B. Relation of the color of bark to the temperature of the cambium in winter. Ecology 4: 391-394. 2 fig. 1923.—Temperatures of the cambium of woody plants with barks of different color were measured in Minnesota in winter by the thermoelectrical method. *Betula alba*, *Cornus stolonifera*, *Salix alba vitellina*, *Populus tremuloides*, and several varieties of apple and plum were used. The bark of the white birch and red osier maintained temperatures nearest that of the air when in strong sunlight, green or yellow barks gave intermediate temperatures, and brown, black, or brownish-red barks maintained the highest temperatures. Black bark may be 4.5°C. warmer in sunlight than white bark. When the air temperature is just below freezing there is a continual rapid freezing and thawing of black bark with every passing cloud, a condition associated with sun scald.—*J. E. Weaver*.

RADIANT ENERGY RELATIONS

5459. KONINGSBERGER, V. J. Lichtintensität und Lichtempfindlichkeit. [Light intensity and sensitiveness to light.] Recueil Trav. Bot. Néerland. 20: 257-312. Fig. 1-10. 1923.—This is a detailed report of experiments in connection with the author's theory [see Bot. Absts. 12, Entry 827] that the growth reaction to light stimulation is fully carried out only in consequence of exposure to a great amount of light, that the light intensity is the limiting factor rather than the duration of illumination, and that a reaction taking place in one intensity will be followed by another reaction, rather than a continuing reaction, if the intensity is increased. Koningsberger conceives the sensitiveness to a given intensity and the power of reaction to be inherent in the plant, as shown by the immediate beginning of a new response, even when the plant has adjusted itself to a certain lower intensity. He was not able to secure sufficiently intense illumination to call forth the maximum possible response or to destroy the sensitiveness to light. He used a pure line of "Victory" oats, crop of 1921, "Argenta" incandescent, pear-shaped, tipless, milk-glass bulbs of 75 watts with a 220 volt current. The lamp was enclosed in a tin tube with an opening on one side only; the lamp was set on a slide which permitted at will a range between $\frac{1}{2}$ and 2 m., or 400 meter-candles to 25 meter-candles. The temperature at which the experiments were conducted was 20°C. There was but slight rise in temperature in the beam of light, 0.1-0.3°C., according to distance and intensity. The observations show that growth is checked by increased illumination, but that growth is delayed for a short time only (12 minutes), increased rate or amount of growth taking place promptly. The latter is an expression of "autotropism," not a part of the reaction to light. He attempted to distinguish between light intensity and quantity of stimulus or stimulant, and says that the extent of the reaction is determined by the quantity of light only when exposure is brief (24 minutes or less), otherwise only by the intensity of the illumination.—*G. J. Peirce*.

TOXIC AGENTS

5460. CLUZET, J., A. ROCHAIX, ET A. CHEVALIER. Recherches sur l'action bactéricide de l'émanation du thorium. [The bactericidal action of thorium emanation.] Compt. Rend. Soc. Biol. 88: 510-512. 1923.—It requires a very high dosage (3,600-7,200 electrostatic units) of thorium emanation to diminish the vitality of bacteria. No sterilizing effect was obtained even though the dosage used was greater than that required to kill a guinea pig.—*Oran Raber*.

5461. REED, H. S., AND A. R. C. HAAS. The pseudo antagonism of sodium and calcium in dilute solutions. Jour. Agric. Res. 24: 753-758. 1 pt. 1923.—Seedlings of several species of *Citrus* grown in solutions lacking Ca showed injury to roots much earlier than to the tops. The species studied are known to have marked capacity for the absorption of Ca ions and in very dilute solutions the amounts of Ca present may be too far below the equilibrium point within the plant to avoid a condition of starvation. The results do not demonstrate an antagonism between Na and Ca when *Citrus* seedlings are grown in very dilute solutions.—H. S. Reed.

5462. SPRECHER, GRETCHEN. The use of precipitated copper for sterilizing purposes. Jour. Amer. Pharm. Assoc. 12: 615-616. 1923.—The author prepared and tested samples of precipitated Cu for sterilizing drinking water. Favorable results were obtained. The procedure suggested is to suspend the precipitated Cu in some inert material, as sand, through which the water may be allowed to percolate.—Anton Hogstad, Jr.

ELECTRICITY AND MECHANICAL FORCES

5463. KOKETSU, RIICHIRO. Über die Wirkungen der elektrischen Reizung an den pflanzlichen Zellgebilden. [Effects of electrical stimulation on cellular structures of plants.] Jour. Dept. Agric. Kyushu Imp. Univ. Fukuoka, Japan 1: 1-133. 40 fig. 1923.—A study of plant responses to electric stimulation was carried out with induction currents applied by means of the Porter apparatus and unpolarizable electrodes and with constant currents applied by means of unpolarizable Oker-Blom calomel electrodes. A considerable variety of structures and reactions was investigated. Form changes seen are correlated in general with increased permeability of the plasma membrane and resulting reduction in osmotic pressure, results that are regarded as the equivalent in plants of contractions seen in animal tissues. The author observed that stomata close and roots and tendrils curve as a result of stimulation. The Brownian movement seen in living protoplasm by indirect illumination ceases on fatal stimulation. As would be expected, the plant reactions occur rather slowly. The greater the strength of the current, the shorter is the latent time. An oscillating after-result was sometimes seen in *Mimosa pudica* and in *Cucurbita* tendrils following the main reaction. In order to produce a reaction, the current must be applied for a definite time—the stronger the current the shorter this time becomes. Opening and closing the circuit, as well as sudden strengthening or weakening of the current strength causes stimulation in plant as well as in animal structures. The summation of repeated stimuli below the threshold intensity was observed even after relatively long time intervals; the more easily, the shorter the time intervals and the stronger the current. By the repetition of single stimuli a "tetanic" reaction was seen in *Chara* and *Tradescantia* cells, probably also in *Cissus* and *Cucurbita* tendrils. In the sensitive stigmas of *Mazus* and in *Mimosa pulvini* the law of All-or-Nothing is seen to apply to the reaction from a single stimulus. The transmission of the stimulation from structure to structure seems to take place through the protoplasm. By rhythmic stimulation of *Chara* cells, the "staircase" effect seen in muscle reaction is brought on, followed by fatigue. Narcotics depress response toward electric stimuli. It was found that on closing the circuit, streaming of the protoplasm of *Chara* cells was reduced or stopped on the cathode side of the cell; the same result was seen on the anode side on breaking the circuit, in agreement with the behavior of nerves and muscles. In *Tradescantia* hairs the results were the reverse. Galvanotropic curvatures in the roots of seedlings toward the anode were ascribed to anodic injury. Spermatozooids of *Funaria* and *Chara* reacted negatively in a weak current. The swarm spores of *Saprolegnia*, reacting negatively outside of the sporangium, reacted positively while enclosed in it. Internal polarization of the cell with the passing of the current was found, involving not only the plasma membrane but also the cell wall. The migration of the protoplasmic cell contents toward the anode end of the cell with the emptying of the end toward the cathode is supposed to be due to negative charges on the plasma particles. Injured areas are electro-negative toward intact areas as in animal tissues. Stimulated parts are also electronegative. Electrical currents can be detected in undisturbed living structures, but that it is not due to the life functions

is shown by the fact that similar but weaker currents are developed in material that has been preserved in alcohol or formalin. In the latter case the current is the reverse of that seen in living objects. A very useful bibliography is included.—*Rodney H. True.*

MISCELLANEOUS

5464. COHEN, A. Xylenol blue and its proposed use as a new and improved indicator in chemical and biochemical work. *Biochem. Jour.* 16: 31-34. 1922.—*p*-Xylenolsulphonephthalein or Xylenol blue, may, according to the author, be preferably employed in all work for which thymol blue has heretofore been recommended. It has 2 working ranges, from pH 1.2 (red) to 2.8 (yellow) and from pH 8.0 (yellow) to 9.6 (blue).—*A. R. Davis.*

5465. MARSH, FRANKLIN W. Indicator reaction as a source of error in pH determinations. *Science* 59: 216. 1924.—Indicator solutions stored in glass bottles may so change in reaction as to give large errors except for highly buffered solutions.—*C. J. Lyon.*

5466. NICLOUX, MAURICE. [Rev. of: PREGI, F. *La micro-analyse quantitative*. Les Presses Universitaires Editeur; Paris, 1923.] *Bull. Soc. Chim. Biol.* 5: 944-946. 1923.—This is a review of a translation into French by G. WELTER of Pregl's work.—*Joseph S. Caldwell.*

SOIL SCIENCE

A. G. McCALL, *Editor*

(See also in this issue Entries 4776, 4791, 4793, 4799, 4801, 4818, 4821, 4866, 4874, 4879, 5059, 5102, 5104, 5335, 5377, 5379, 5380, 5452)

5467. BOS, H. Een grondwaterstandmeter. [A soil-water meter.] *Landbouwk. Tijdschr.* 1: 54-62. 6 fig. 1924.—The writer has constructed an instrument which shows the height of the water table in the soil. The height of the water can be read on a scale which projects above the surface.—*J. C. Th. Uphof.*

5468. CHRISTENSEN, HAROLD, OG S. TORBORG JENSEN. Undersøgelser vedrørende elektrometriske Metoder til Bestemmelse af Jordreaktionerne. [Research on electrometrical methods of determining soil reactions.] *Tidsskr. Planteavl* 29: 783-815. 1923.—The quinhydrone electrode of E. Biilmann was found to be equally as effective as the H-ion electrode in making electrometrical measurements of various types of Danish soils. The electrometrical determination of reactions of soil suspensions was found to be more reliable than colorimetric determination, and will be used at the State Laboratory for Plant Culture in determining the lime requirement of soils. The acidity boundary for Azotobacter development is near reaction figure 6. Below 5.9 no development was observed, while at 7.4 the soil is in condition for Azotobacter development. From 6.1 to 7.4 there is nothing certain regarding lime requirement and the Azotobacter test is necessary. Ordinary test tubes are used as electrode vessels when the binding liquid is stiffened with agar to prevent the diffusion of KCl into the soil suspension. The relation between the electrometrical reaction figure and the results of the Hasenbaumer-Comber test agree closely with earlier results of colorimetric reaction determinations.—*Albert A. Hansen.*

5469. CUTLER, D. WARD, LETTICE M. CRUMP, AND H. SANDON. A quantitative investigation of the bacterial and protozoan population of the soil, with an account of the protozoan fauna. *Phil. Trans. Roy. Soc. London B*, 211: 317-350. 8 fig. 1922.—This is probably the most comprehensive quantitative bacterial and protozoan analysis of a soil ever completed. Bacteria and protozoa were determined daily on one of the Rothamstead plots for a period of 365 days. Not only were the total numbers of protozoa recorded, but also the numbers of the various species present at each analysis both in the active and encysted state. The principal points brought out were: (1) a very marked daily fluctuation in total numbers of both bacteria and different types of protozoa; (2) a well marked seasonal change in the soil population superimposed upon the daily fluctuations, with the maximum at the end of November and the minimum at the end of February or early in March, with a further high point at the end of

June; (3) the variations in bacterial and protozoan numbers could not be correlated with moisture content of soil, rain fall, soil temperature, farm operations, chemical changes in the soil, or auto-intoxication; (4) a definite correlation was found between the numbers of 2 forms of protozoa and bacterial numbers—in 86% of comparable cases the bacterial number varied inversely with the number of active forms of these 2 amoebae, indicating that these 2 protozoa were important factors in controlling the numbers of bacteria; (5) a definite 2-day periodicity in active forms was found to occur with 1 species of flagellate; (6) 32 species of protozoa were recorded as being present more or less frequently.—*P. L. Gainey.*

5470. GAINNEY, P. L. A study on the effect of changing the absolute reaction of soils upon their *Azotobacter* content. *Jour. Agric. Res.* 24: 289-296. 1923.—Soils less acid than pH 6 normally contain *Azotobacter* while those more acid do not. If 2 soils, one more acid and one less acid than pH 6 are mixed in varying proportions, *Azotobacter* survives only in those mixtures the reaction of which is less acid than pH 6. The addition of acid to a soil less acid than pH 6, and containing *Azotobacter*, renders the soil incapable of supporting these organisms provided the quantity of acid is sufficient to maintain a reaction more acid than pH 6. The addition of CaCO_3 to a soil more acid than pH 6 renders it capable of supporting *Azotobacter* provided sufficient CaCO_3 is added to maintain a reaction less acid than pH 6.—*Author.*

5471. GAINNEY, P. L. Influence of the absolute reaction of a soil upon its *Azotobacter* flora and nitrogen fixing ability. *Jour. Agric. Res.* 24: 907-938. 1 fig. 1923.—In the examination of a large number of soils a very close correlation was found between the reaction of a soil and the presence therein of *Azotobacter*. Very few soils more acid than pH 5.9-6.0 were found to contain *Azotobacter* whereas these organisms were almost universally present in soils less acid. An association coefficient of 0.960 was found for these 2 factors. The quantity of N fixed in a cultural solution inoculated from these soils was approximately twice as great when *Azotobacter* was present as when it failed to develop.—As a rule there was only slight difference in the reaction as determined colorimetrically on an extract of a soil and electrometrically on a suspension, the average of all soils being pH 6.09 electrometrically and pH 6.11 colorimetrically. Sometimes, however, there was a quite marked difference. Approximately 50% of all soils examined were more acid than pH 6.0. A number of soils collected from limed plots at eastern experiment stations less acid than pH 6.0 did not contain *Azotobacter*, indicating that under field conditions natural inoculation may occur or be a long time delayed depending probably upon the proximity of soils containing *Azotobacter* and the activity of agencies concerned in transferring it from one point to another.—*Author.*

5472. GAINNEY, P. L. On the use of calcium carbonate in nitrogen fixation experiments. *Jour. Agric. Res.* 24: 185-190. 1923.—The addition of CaCO_3 to the medium in which the N-fixing ability of the free living N-fixing organisms of soils is to be tested almost always results in the fixation of larger quantities of N. *Azotobacter* can be cultured, in a medium containing CaCO_3 , from some soils that would not show its presence in a medium not containing CaCO_3 .—*Author.*

5473. GIMINGHAM, C. T. On the colorimetric determination of hydrogen-ion concentration in soils. *Jour. Agric. Sci.* 13: 69-73. 1923.—To obviate the possible error in colorimetric determinations of soil acidity, a method of obtaining a clear soil extract was devised. Plain glass cylinders 12 inches long and 2 in diameter were used, in which were placed layers of cleaned coarse sand, upon the top of which the moist soil was placed. When distilled water was percolated through this column the first 50 cc. of water collected was clear. In many cases the second, third, and fourth 50 cc. quantities collected showed higher H-ion concentration values than the first.—*W. Rei Robbins.*

5474. GIMINGHAM, C. T., AND R. H. CARTER. On the estimation of nitrates in soils by the phenol disulphonic acid method. *Jour. Agric. Sci.* 13: 60-62. 1923.—To remedy the difficulty of irregular, and usually too low results in the estimation of small amounts of nitrates in the soil by the phenol disulphonic acid method, a coarse filter paper, Whatman No. 1, which retained less nitrate in filtering, was found most satisfactory.—*W. Rei Robbins.*

5475. HENDRICK, J., AND G. NEWLANDS. The value of mineralogical examination in determining soil types, with a method of examination and a comparison of certain English and Scottish soils. *Jour. Agric. Sci.* 13: 1-17. 1 fig. 1923.

5476. JOSEPH, A. F., AND F. J. MARTIN. The moisture equivalent of heavy soils. *Jour. Agric. Sci.* 13: 49-59. 1 fig. 1923.—The relation between moisture equivalent of soils and other properties, the maximum amounts of water found after irrigation, and the hygroscopic coefficient are discussed. In the determination of the moisture equivalent the following facts were apparent: the moisture equivalent of a normal soil diminishes as the weight of the soil taken; in soils impermeable to water in thick layers, the increase in moisture equivalent may become large due to water-logging; dilute solutions of flocculating salts such as CaSO_4 and NH_4NO_3 reduce the moisture equivalent, and Na_2CO_3 increases it; the soils which water-logged easily had a higher concentration of OH ions.—*W. Rei Robbins.*

5477. LIPMAN, JACOB G., AND AUGUSTINE W. BLAIR. Report of the Department of Soil Chemistry and Bacteriology. *Ann. Rept. New Jersey Agric. Exp. Sta.* 42: 303-322. 3 fig. 1920/21 [1922].—The following topics are discussed in this report. (1) Influence of mechanical composition of the soil on availability of nitrate of soda and dried blood. In this work, conducted over a 10-year period, a comparison of these 2 N sources has been made in soils varying in mechanical composition from loam to coarse sand. Neither form of N showed high residual effects but the blood usually surpassed the nitrate in crops grown for the residual effect. With the exception of 1 series with high sand content, however, the initial effect of the nitrate was usually sufficiently in advance of the initial effect of the blood to carry the effect of the former farther than the latter. Except in almost pure sand soils, the organic N was not superior to the inorganic N sources.—(2) The continuous growing of wheat and rye with and without a legume as a green-manure crop. The yield of rye grain on plots on which soy beans were ploughed under was more than double that of plots with a legume, the total nitrogen being 53.2 and 24.4 pounds per acre. On wheat plots which received a legume the yield of grain was 7.9 bushels greater than on non-legume plots.—(3) The continuous growing of corn with a legume and a non-legume green-manure crop. The yield of corn on the legume section was $15\frac{1}{2}$ bushels larger than on the non-legume section, the legumes being vetch and a mixture of clovers and the non-legume, rye.—(4) The influence of lime in the yield and N content of soybeans. With a proper supply of phosphoric acid, potash, and lime, soybeans may be grown year after year on the same land. Soils having a lime requirement of 600-800 pounds or more show a response to lime where soybeans are being grown.—*Wm. H. Martin.*

5478. MILLER, MERRITT FINLEY. The soil and its management. v + 386 p., illus., map. Ginn & Co.: Boston, 1924.

5479. NASIR, S. M. Some observations on the barren soils of Lower Bari Doab Colony in the Punjab. *Agric. Res. Inst. Pusa Bull.* 145. 11 p. 1922.—A comparison is made of these barren soils with normal soils as to physical character, chemical analysis, and bacterial content. The effect of various soil treatments upon the ammonifying bacteria is also discussed.—*N. J. Giddings.*

5480. PANGANIBAN, ELIAS H. Rate of decomposition of organic nitrogen in rice paddy soils. *Philippine Agric.* 12: 63-75. 1923.—During the dry season, when rice fields were lying fallow, the decomposition was slow, as measured by CO_2 evolution, but there was a large accumulation of ammonia nitrogen. After heavy rains there was an active evolution of CO_2 , and nitrification proceeded rapidly with the consequent conversion of ammonia into nitrates. Evolution of CO_2 was active even in submerged soils, but the ammonia present was much less than under aerobic conditions. Under aerobic conditions evolution of CO_2 was greater in moist than in dry soils. Total nitrogen content increased, probably by nitrogen fixation. Under submerged conditions, the ammonia content was practically zero and nitrates were absent.—*Sam F. Trelease.*

5481. WAKSMAN, S. A. Influence of soil reaction upon the distribution of filamentous fungi in the soil. *Ecology* 5: 54-59. 1924.—Two groups of methods are given for the study of distribution and activities of fungi in soil. It was found that the development of fungi in the soil is stimulated or retarded depending on whether the fertilizers used increase or diminish the acidity of the soil.—*T. J. Fitzpatrick.*

5482. WHITTLES, C. L. The determination of the number of bacteria in soil. *Jour. Agric. Sci.* 13: 18-48. 3 pl., 5 fig. 1923.—A method is evolved for estimating the numbers of soil organisms by direct count, the numbers found being much higher than any previously reported.

A method for the dispersion of soil particles and bacteria by vibration was devised by which plate counts were made comparable to direct counts. A bibliography of 225 references accompanies the paper.—*W. Rei Robbins.*

5483. WIELER, A. Die Beteiligung des Bodens an den durch Rauchsäuren hervorgerufenen Vegetationsschaden. [The part played by the soil in injury to vegetation from smoke acids.] Zeitschr. Forst.- u. Jagdw. 54: 534-543. 1922.—The barrenness of the soil of cities and large industrial districts is largely explained by the fact that the acid gases of smoke form soluble compounds with the constituents of the soil and thus cause them rapidly to leach away, as set forth in the author's published works of 1905 and 1912. Direct evidence of this is wanted but it has been shown that the filtrate from 1 kgm. of soil treated with 2 l. of water containing 1.28 gm. SO_2 contained 6-10 times as much of the oxides of Fe and Al, Ca, Mg, K, and Na, and 100 times as much SO_3 as that of the check treated with distilled water. In Munich 1 kgm. of fresh snow was found to contain 7.5 mgm. of SO_3 . During the succeeding 16 days of fair weather this content increased at the rate of 5 mgm. per day. The SO_3 content of the annual precipitation in districts varying greatly in smoke production was directly in proportion to the amount of smoke and from 15 to 89.6 gm. fell upon every square m. of soil—sufficient to remove 10-62.02 gm. of lime. Upon smoke barrens vegetation was made to grow normally in several districts by the application of lime.—*Wyatt W. Jones.*

5484. WINOGRADSKY, S. Sur la méthode direct dans l'étude microbiologique du sol. [Direct method of studying the microbiology of the soil.] Compt. Rend. Acad. Sci. Paris 177: 1001-1004. 1923.—This is a general discussion of the present status of the study of soil organisms. It is pointed out that although much detailed work has been done on a few organisms, the general survey of the microbic population of the soil remains largely untouched. It is suggested that direct microscopic observations be made on a large scale, and that auxiliary cultures be maintained both in soil and on artificial media. Growth for only a short period (3-5 days at $30^\circ\text{C}.$) is recommended.—*C. H. Farr.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PAYSON, *Assistant Editor*

(See also in this issue Entries 4772, 4805, 4876, 4896, 4904, 4957, 4963, 5029, 5053, 5077, 5109, 5112, 5114)

GENERAL

5485. BAILEY, L. H. Manual of cultivated plants. A flora for the identification of the most common or significant species of plants grown in the continental United States and Canada for food, ornament, utility and general interest, both in the open and under glass. 8 vo, 851 p., illus. The Macmillan Co.: New York, 1924.—The purpose of the author is to provide a ready means of identifying plants ordinarily met with in the gardens of the continental U. S. A. and Canada. It is the first attempt, at least in the English language, to treat the domesticated flora of a country from the point of view of the systematic botanist and thus forms a companion to regional floras such as Gray's Manual, Britton's Manual, Small's Flora of the Southeastern United States and others, which it resembles in the general arrangement and treatment of the matter. It comprises the whole vegetable community from the Fungi to the Compositae being arranged according to Engler's system like the majority of the modern floras. The main part starts with a dichotomous key to the families leading through subsequent keys under families and genera to the name of the species. The description of the families, genera, and species are brief but give all the important characters necessary for identification and the most important structural details are elucidated by 14 full page illustrations containing numerous figures. Of varieties only the most important ones are mentioned. In regard to the Latin names the author has followed consistently the International Rules of Nomenclature; of English or common names only those in actual use are given and of

synonyms only the most important are cited. The number of species described in the Manual is 3,665 belonging to 1,246 genera and 170 families, aside from incidental references which frequently occur. The descriptive part of the work is preceded by chapters dealing with the purpose of the book, with the making and use of an herbarium, by a glossary of technical terms and a list of authors' names. In the glossary of technical terms the most frequently employed specific names are included, their meaning explained and pronunciation indicated; for the less frequent specific and for the generic name this information is found under these names in the main body of the work. In the list of authorities for the binomials each name is followed by a short biographical note.—*Alfred Rehder.*

5486. BARTSCH, P. **Stenomorph, a new term in taxonomy.** Proc. Biol. Soc. Washington [D. C.] 36: 199. 1923.—A stenomorph is a diminutive form produced by a cramped habitat.—*J. C. Gilman.*

5487. HITCHCOCK, A. S. **Type species of the first 100 genera of Linnaeus' Species Plantarum.** Amer. Jour. Bot. 10: 510-514. 1923.—Applying the rules of the Type-basis Code, the author has determined the type species for the first 100 genera of the Species Plantarum. He shows that in selecting types one should of course exclude species which are anomalous and do not agree with the generic description. Such cases are exceptional among Linnaean genera. One should then ascertain which species the author had in mind, if it can be so singled out. It may be assumed that such a species would be the one best known to the author, which may be ascertained by determining whether he has applied to it a specific name like *officinalis*, *communis*, *vulgaris* or *sativus*; whether it is a well-known economic species; whether it is a common species in the native flora or one grown by the author in a garden; or whether it is cited in the Genera Plantarum. After applying these criteria there will remain a few genera (20 in this list of 100) in which it is difficult to determine readily the type species, but most of these difficulties can easily be overcome. The author illustrates these principles in his choice of these first 100 type species.—*E. W. Sinnott.*

5488. HOSTIE, E. **Planten- en dierenleven in de Vogeezen.** [Plant and animal life in the Vosges.] Natuurwetenschapp. Tijdschr. 5: 128-131. 1923.—The flora of the Vosges has thus far been little studied. A general account is given of an excursion in certain parts of this mountain group, in which the principal plants and animals are mentioned.—*J. C. Th. Uphof.*

5489. JIVANNA RAO, P. S. **New names for old plants.** Jour. Madras Agric. Students Union 10: 282-283. 1922.—Revised names of 30 common plants and weeds of South India are given based on Gamble's Flora of the Presidency of Madras.—*P. S. Jivanna Rao.*

5490. KIRSTEIN, KARL. **Sero-diagnostische Untersuchungen über die Verwandtschaften innerhalb der Pflanzengruppe der Gymnospermae.** [Sero-diagnostic investigations on the relationships within the gymnosperms.] Bot. Archiv 2: 57-79. 1 fig. 1922.—*Abies pectinata*, *Picea excelsa*, and *Pinus sylvestris* show so close a physiological-chemical identity in their albumin that they can hardly be distinguished. The Abietineae therefore comprise a group whose forms are phylogenetically very closely related. The albumin relationship of the Taxaceae is as follows: they are joined to the Abietineae through *Taxodium*, contain the Podocarpeae and *Torreya* and end with the Ginkgoaceae. The connection of the Cupressineae (*Biota*, *Juniperus*) and the Gnetaceae (*Ephedra*) is not a direct one; they are joined to the Abietineae indirectly through the Taxodiaceae (*Taxodium*). Immunsera which so clearly indicated a relationship between the Abietineae and *Selaginella*, *Magnolia* and *Ginkgo* showed no such connection in the case of the *Araucaria*. No albumin relationship exists between the Cycadaceae and the Coniferae. The cycads represent therefore a line of decent from their Hepaticae (Anthocerotaceae?) ancestors which is quite distinct from that of the Coniferae.—*William Seifriz.*

5491. MILLSPAUGH, CHARLES F., AND LAWRENCE W. NUTTALL. **Flora of Santa Catalina Island [California].** Field Mus. Nat. Hist. Bot. Ser. 5: 1-413. Pl. 1-14, 1 map. 1923.—Santa Catalina Island, 22 miles long and 3-8 miles wide, lies off the coast of southern California. A general account of its physiography and a description of its principal collecting stations are given. Following these is an annotated list of previous plant collectors who have collected on the Island. In the text are described 882 species, belonging to 459 genera. Of these, 257 genera with 455 species belong to the Spermatophyta, 7 genera with 12 species to the Pteri-

dophyta, 122 genera with 36 species to the Bryophyta and 173 genera with 379 species to the Thallophyta. The fungus hosts are indexed alphabetically. A supplement of 5 pages gives many facts additional to those in the text proper. The following new species, names, and combinations, of which Millsbaugh is the author unless otherwise indicated, are included: (1) vascular plants—*Eschscholtzia Wrigleyana*, *Jepsonia neonuttalliana*, *Hosackia anthylloides* (*H. grandiflora* var. *anthylloides* Gray), *Tithymalus leptocerus* (*Euphorbia leptocerus* Engelm.), *Crocanthemum scoparium* (*Helianthemum scoparium* Nutt.), *Acrolasia catalinensis*, *Svida catalinensis*, *Cuscuta occidentalis* (*C. californica* var. *breviflora* Engelm.), *Nemophila erodifolia*, *Antirrhinum Hookerianum* (*Maurandya stricta* Hook. & Arn.), *Scrophularia villosa* Pennell, *Mimulus Traskiae* Grant, *Lonicera catalinensis*; (2) non-vascular plants—*Desmatodon Hendersoni* Williams (*Didymodon Hendersoni* Ren. & Card.), *Solenia cinerea* Burt, *Phyllosticta rhoiseda* Fairman, *Phoma Megarrhizae* Fairman, *Phomopsis Nicotianae* Fairman, *Sphaeropsis nebelina* Fairman, *Coniothyrium leprosum* Fairman, *C. Marrubii* Fairman, *Diplodia heteromelina* Fairman, *Microdiplodia Mimuli* Fairman, *M. Ramonae* Fairman, *Camarosporium eriocryptum* Fairman, *Sphaerographium avenaceum* Fairman, *Discosia poikilomera* Fairman, *Dicaeoma Nemoseridis* Fairman, *Helotiella microspora* Burt, *Stictis lanuginicincta* Fairman, *Glonium vestigiale* Fairman, *Myrangium catalinae* Fairman, *Phyllachora Nuttalliana* Fairman, *Strikeria catalinae* Fairman, *Teichospora lonicerina* Fairman, *Mycosphaerella Chlorogalli* Fairman, *M. Nemoseridis* Fairman, *Physalospora eucalyptina* Fairman, *P. heteromelina* Fairman, *Didymella Ramonae* Fairman, *Leptosphaeria Galiorum gnaphaliana* Fairman, *Pleospora Chlorogalli* Fairman, *Valsa holodiscina* Fairman, *Eutypella ceranata* Fairman, *E. domicalis* Fairman, *Arthothelium subcystodes* G. K. Merrill (*Arthonia subcystodes* Willey), *Lecanactis dubia* G. K. Merrill, *Cladonia ochrochlora* f. *evoluta* G. K. Merrill, *Lecanora cancriformis* (Hoffm.) G. K. Merrill, *Phlyctis argena* f. *mucronata* G. K. Merrill.—Earl E. Sherff.

5492. THONE, FRANK E. A. *Trees and flowers of Yellowstone National Park*. 70 p., illus. J. E. Haynes: Saint Paul, 1923.—This small volume describes in non-technical language and illustrates by reproduced photographs and sketches about 100 of the common trees, shrubs and herbs of the Yellowstone National Park. The book has received the approval of the National Park Service.—J. M. Greenman.

5493. VALCKENIER SURINGAR, J. *De wetenschappelijke namen onzer houtgewassen*. [The scientific names of the woody plants of Holland.] Mededeel. Landbouwhoogeschool Wageningen 27: 1-35. 1923.

5494. WORSECK, ERNST. *Sero-diagnostische Untersuchungen über die Verwandtschaftsverhältnisse der Monocotyledonen*. [Serum diagnoses of relationships among the monocotyledons.] Bot. Archiv 2: 177-206. 1922.—Serum reactions of the Alismataceae place this family at the base of the monocotyledons. The Butomaceae stand near the Alismataceae but above them and below the Typhaceae. The Juncaginaceae give a strong positive reaction with *Alisma Plantago* thus establishing a close relationship with the Alismataceae. The position of Potamogetonaceae is not definite. They apparently belong at the base of the monocotyledons but above the Alismataceae. The Typhaceae are placed on a special branch which leaves the main axis of the monocotyledons just above the Alismataceae. The Sparganiaceae are closely related to the Typhaceae. The Gramineae are to be regarded as a reduced and not an original form of the monocotyledons. On the Gramineae branch are the Cyperaceae and Commelinaceae. The Liliaceae take a position just midway on the main axis of the monocotyledons. The Palmae can in no sense be placed at the base of the monocotyledons but must be placed between the Alismataceae and Liliaceae. The Zingiberaceae are a highly developed family of the monocotyledons reacting serologically with the highest of the monocotyledons, the Orchidaceae.—William Seifriz.

PTERIDOPHYTES

5495. ALDERWELT VAN ROSENBURGH, C. R. W. K. *New or interesting Malayan ferns* 12. Bull. Jard. Bot. Buitenzorg III, 5: 179-240. 1922.—Additional information and notes on previously described Malayan pteridophytes are given and the following new species, varieties, and combinations are recorded: *Alsophila Janseniana*, *A. allocota*, *A. glabrescens*, *A. spinifera*, *Angiopteris lancifoliolata*, *A. athrocarpa*, *A. monstrosa* v. *A. v. R.* var. *pseudomacroglossum*,

Aspidium tricuspe Bedd. var. *glabrum*, *Asplenium cymbifolium* Christ. f. *typicum* and f. *lingganum*, *A. pseudocaudatum*, *Cyathea Bunnemeijeri*, *C. arthropterygia*, *C. longipes*, *C. acanthopoda*, *C. trachypoda*, *C. ternatea*, *Cyclophorus cinnamomeus*, *C. adnascens* Desv. f. *dichotoma*, *Dictyopteris distincta*, *D. compitalis*, *Diplazium dolichosorum* Copel. var. *aculeolatum*, *D. cardiomorphum*, *D. opatellum*, *D. permirabile*, *D. proliferum* Thouars var. *accedens* (*D. accedens* Bl.), *Dryopteris auriculifera*, *D. vinosicarpa*, *D. megalocarpa*, *D. subalpina*, *D. plurifolia*, *D. cryptocaulos*, *D. dicranogramma*, *D. urophylla* Christ. var. *peraspera*, *Elaphoglossum dolichaulon*, *Gleichenia linearis* Clarke vars. *crassifrons* and *bidentata*, *Hemitelia rudimentaris* and f. *major*, *Humata attenuata*, *H. mutata*, *H. sessilifolia* Mett. var. *polypodioides* (*H. polypodioides* Brack.), *Hymenophyllum pleiocarpum*, *H. lingganum*, *Lindsaya alpestris*, *L. tropidorachis*, *L. canaliculatis*, *L. parallelogramma*, *Lomagramma melanolepis*, *Lygodium derivatum*, *Nephrolepis biserrata* Schott f. *typica* and f. *aberrans*, *Phegopteris heterolepis* v. A. v. R. var. *remota* subvar. *major*, *Pleocnemia Leuzeana* Pr. f. *maxima*, *P. porphyrocaulos*, *Pleopeltis brevidecurrens*, *P. incurvata* Moore f. *typica* and f. *transversalis*, *P. pseudoloxogramma*, *P. Feei* v. A. v. R. f. *typica* and f. *hastifolia*, *Polypodium pseudorevolvans*, *P. subhamato-pilosum*, *Polystichum eriorachis*, *P. flaccidum*, *P. dendrophilum*, *Pteris orientalis* v. A. v. R. f. *typica* and f. *glabra*, *P. Wallichiana* Agardh. var. *matoniiiformis*, *Schizoloma auriculatum* (*S. divergens* Kuhn var. *auriculata* v. A. v. R.), *Stenosemia aurita* Pr. var. *reducta*, *Trichomanes piliferum*, *T. sumatranum* v. A. v. R. f. *stipulatum*, *Vittaria ensiformis* Sw. f. *typica*, vars. *substipitata* and *dilatata*, *Lycopodium multifarium*, *L. transiens*, *L. cernuum* L. var. *capillifolium*, *Selaginella pentaplebia*, *S. speluncae* f. *typica* and var. *effugia*, *S. pseudovenulosa*, *S. bimarginata*, *S. spuriemarginata*, *S. ceratocaulos* v. A. v. R. f. *kangeanensis*, *S. palembanica* v. A. v. R. var. *subtrineria*, *S. propinqua*, *S. pilosula*, *S. petrophila*, *S. papana*, *S. modica*, *S. varians* f. *typica* and f. *sciaphila*, *S. aristata* Spring. var. *Kaudernii*, *S. verruculosa*, and *S. Usteri* Hieron. var. *halmaherae*.—A. Rehder.

5496. CHRISTENSEN, CARL. On a collection of Pteridophyta from Celebes leg. Dr. W. Kaudern. Svensk Bot. Tidskr. 16: 88-102. 1922.—A list is given of 88 species of ferns, chiefly large earth-ferns or species growing epiphytically on trees, which were collected by Kaudern during his travels in northern, central, and eastern Celebes in 1917-1920. Of these, notes, descriptions and illustrations (in part) are given of 15 new species and forms. The following new species, varieties and combinations are included: *Asplenium dicranurum*, *Diplazium acanthopus*, *Dryopteris sagenioides* (Bl.) var. *gurupahensis*, *D. multilineata* (*Aspidium multilineatum* (Pr.) Mett.), *Humata Kaudernii* and var. *variabilis*, *Lomagramma sinuata*, and *Polypodium sculpturatum*.—W. W. Gilbert.

5497. T., J. McL. Characters and history of the ferns. [Rev. of: BOWER, F. O. The ferns (Filicales) treated comparatively with a view to their natural classification. Vol. 1. Analytical examination of the criteria of comparison. x + 359 p. University Press: Cambridge, 1923 (see Bot. Absts. 13, Entry 3157).] Nature 112: 499-500. 1923.—The book is regarded as a classic, a landmark in the progress of systematic thought.—O. A. Stevens.

SPERMATOPHYTES

5498. AMES, OAKES. Additions to the orchid flora of Tropical America with illustrations of *Pleurothallis* and observations on noteworthy species. Schedulae Orchidianae No. 7. P. 1-36, pl. 4-20, fig. 1-6. March 27, 1924.—The present number contains illustrations of several species of *Pleurothallis* and the results of a further study of the Central American orchid flora. The following new species, names, and combinations are included: *Basiphyllaea corallicola* (*Carteria corallicola* Small), *Cranichis Viereckii*, *Epidendrum bilobatum*, *E. chinense* (*Broughtonia chinensis* Lindl.), *E. circinatum*, *E. glandulosum*, *E. linifolium*, *E. Schlechterianum* (*E. brevicaulis* Schltr. in Fedde Repert. Beihefte 17 (1922) 30, not Schltr. in Fedde Repert. Beihefte 9 (1921) 81), *E. Storkii*, *Maxillaria Lankesteri*, *Oncidium floridanum* (*O. sphacelatum* Ames, not Lindl.), *Pelexia callosa*, *Pleurothallis aperta* (*Masdevallia aperta* Kränzl.), *P. divexa* (*P. dichotoma* Ames, not Schltr.), *P. hondurensis*, *P. periodica*, *P. pompalis*, *P. stenostachya* Reichb. f. var. *Lankesteri* (*P. Lankesteri* Rolfe), *Polystachya Powellii*, *Rolfea Powellii*, *Sobralia corazoi* Lankester & Ames, *Triphora cubensis* (*Pogonia cubensis* Reichb. f.), and *Vanilla fragrans* (*Myrobroma fragrans* Salisb.).—J. M. Greenman.

5499. BECCARI, O. *Neue Palmen Papuasiens II.* [New palms of Papuasia.] Bot. Jahrb. 58: 441-462. 1923.—The article was prepared for the press by his son after the author's death. The following species are proposed as new: *Areca Ledermanniana*, *A. congesta*, *Kentia Ledermanniana*, *Gulubia affinis*, *G. crenata*, *G. obscura*, *Calyptrocalyx polyphyllus*, *C. pauciflorus*, *C. angustifrons*, *C. bifurcatus*, *Cyrtostachys Ledermanniana*, *Ptychococcus elatus*, *Heterospatha Ledermanniana*, *Rhopaloblacte Ledermanniana*, *Leptophoenix incompta*, *Calamus Ledermannianus*, *C. brevifolius*, *C. sepikensis*, *C. scabrispathus*, and *C. fuscus*.—K. M. Wiegand.

5500. BENOIST, RAYMOND. *Descriptions d'espèces nouvelles de Phanérogames.* [New species of phanerogams.] Bull. Mus. Hist. Nat. [Paris] 27: 111-116. 1921.—The author describes: *Erodium Vieillardii*, *Convolvulus leucochneus*, *Anchusa alba-rosea* from Morocco; and *Theobroma velutinum*, *Lühea maroniensis*, *Alexa Wachenheimi*, *Inga conglomerata* from French Guiana.—John M. Fogg, Jr.

5501. BLAKE, S. F. *New botanical names.* Proc. Biol. Soc. Washington [D. C.] 36: 200. 1923.—*Cordia megalantha* (*C. macrantha* Blake, not Chod.), *Pseuderanthemum adenocarpum* (*Eranthemum adenocarpum* Blake), and *P. tetrasepalum* (*E. tetrasepalum* Blake), are recorded as new names.—J. C. Gilman.

5502. BOIS, D. *Floraisons observées dans les serres du Muséum du 21 Juin au 31 Décembre 1920.* [Flowering of plants in the greenhouses of the Museum.] Bull. Mus. Hist. Nat. [Paris] 26: 670-674. 1920.—An alphabetically arranged list of the monocotyledons and dicotyledons which bloomed in the greenhouses of the Museum of Natural History in Paris between June 21 and December 31, 1920 is given. One new species, *Polystachya Caillei* Guillaumin is described.—John M. Fogg, Jr.

5503. BOIS, D., ET J. GÉRÔME. *La Chilacayote du Mexique (Cource de Siam): Cucurbita ficifolia Bouché (C. melanosperma Al. Braun).* [The Chilacayote of Mexico: *Cucurbita ficifolia*.] Bull. Mus. Hist. Nat. [Paris] 26: 675-678. 1920.—(I) Historic. The rules of nomenclature give priority to Bouché's name for the Fig-leaved Pumpkin, *Cucurbita ficifolia* Bouché (= *C. melanosperma* Al. Braun). This plant must not be confused with *C. ficifolia* Wallich, which in reality is *Trichosanthes himalayensis* C. B. Clarke. It has been known in France as "Malabar melon" and "Siam pumpkin" (Cource de Siam), and was long thought to be of Asiatic origin. J. N. Rose, however, positively identifies it with the Chilacayote of Mexico, a result which San Jose confirms. Study of the etymology of the word "Chilacayote," which is derived from the Nahuatl tongue, makes it apparent that this plant is indigenous in Mexico and grew there before the Spanish conquest. (II) Economic. The seed of this pumpkin were introduced into France at the Museum in 1854, from China, where the plant was already widely cultivated. Paillieux and Bois saw its economic possibilities and encouraged its use as fodder and as a vegetable. Since that time, considerable attention has been devoted to the cultivation of this Chilacayote or Black-seeded Pumpkin.—John M. Fogg, Jr.

5504. BRITTON, NATHANIEL LORD. *Studies of West Indian plants—XII.* Bull. Torrey Bot. Club 51: 1-12. 1924.—From Cuba are described the following new species: *Cyperus naguensis* Britton, *Reynosa camagueyensis* Britton, *Peperomia Leoclemerocana* Trelease, *Clidemia Clementiana* Britton, and *Rondeletia Ekmanii* Britton & Standley. From Hispaniola: *Kallstroemia incana* Rydberg. From Trinidad: *Anthurium aripoense* N. E. Brown, *Piper maravalanum* Trelease, *P. aripoense* Trelease, *Prestonia Brittoni* N. E. Brown, *Decastelma trinitense* N. E. Brown. The new genus *Necramium* Britton of the Melastomaceae is described from Trinidad for *N. gigantophyllum* Britton sp. nov. A key is given to the species of the genus *Dorstenia* in the West Indies, 13 are recognized, the following being new: *D. Rocana* Britton, *D. Roigii* Britton, *D. confusa* Britton. From Porto Rico Britton describes the following new species: *Maytenus ponceana*, *Eugenia Underwoodii*, *E. boqueronensis*, *E. Stewardsonii*, *E. (?) corozalensis*, *E. (?) xerophytica*, and *Calyptranthes portoricensis*.—P. A. Munz.

5505. CAMUS, AIMÉE. *Note sur le genre Neohusnotia A. Camus.* [The genus *Neohusnotia* (Gramineae).] Bull. Mus. Hist. Nat. [Paris] 26: 664. 1920.—The new genus *Neohusnotia* is intermediate between the American genus *Lasiacis* (Griseb.) Hitch. and the genus *Acroceras* Stapf. It comprises at present a single Asiatic species, *N. tonkinensis* A. Camus (= *Panicum tonkinense* Balansa).—John M. Fogg, Jr.

5506. CAMUS, AIMÉE. Note sur le genre *Pseudosorghum* A. Camus. [The genus *Pseudosorghum* A. Camus.] Bull. Mus. Hist. Nat. [Paris] 26: 662-663. 1920.—This new genus is described and to it are referred 2 Asiatic and Malaysian species: *Pseudosorghum fasciculare* A. Camus (= *Andropogon fascicularis* Roxb., *A. gangeticus* Hack., and *A. tonkinensis* Balansa) and *P. Zollingeri* A. Camus (= *Andropogon Zollingeri* Steud., *A. asperifolius* Hack., and *Ischaemum Zollingeri* Miq.).—John M. Fogg, Jr.

5507. CAMUS, AIMÉE. Note sur le genre *Pseudovossia* A. Camus. [The genus *Pseudovossia* (Gramineae).] Bull. Mus. Hist. Nat. [Paris] 26: 665. 1920.—The new genus *Pseudovossia*, of the tribe *Andropogonae*, approaches *Vossia*, from which, however, it differs by having a lax inflorescence; well spaced internodes; sessile spikelets not placed in depressions of the rachis; inferior glume with 1 dorsal keel (*Vossia* has 2); pedicel long, articulated; and superior glume spurred at the base. The genus includes a single species, *P. cambogiensis* A. Camus (= *V. cambogiensis* Balansa).—John M. Fogg, Jr.

5508. CHERMEZON, H. Ombellifères. In LECOMTE, H. Fl. Indo-Chine 2: 1133-1157. Fig. 135-136. 1923.—The author treats the genera from *Centella* to *Torilis*. The single new variety, *Bupleurum tenue* Buch.-Ham. var. *exaltatum*, is included.—Fanny Fern Smith.

5509. CONRAD, L. Note sur une graine appartenant au genre *Milletia*. [A seed belonging to the genus *Milletia* (Leguminosae).] Bull. Mus. Hist. Nat. [Paris] 26: 660-661. 1920.—The author gives a description of a seed received from Kouy-Tchéou, which apparently belongs to the genus *Milletia*, but which surpasses in size any other fruit of that genus, and for which, because of insufficient data, specific determination is impossible.—John M. Fogg, Jr.

5510. DANGUY, PAUL. Lauracées de la forêt d'Analamazaotra (Madagascar). [Lauraceae from the forest of Analamazaotra (Madagascar).] Bull. Mus. Hist. Nat. [Paris] 26: 650-653. 1920.—*Ravensara*? *Tapak* H. Bn. is transferred to *Mespilodaphne* *Tapak*. Three new species of *Mespilodaphne* are described: *M. racemosa*, *M. Faucherei*, and *M. Thouvenotii*. A new genus is erected, namely, *Thouvenotia*, and 1 new species described, *T. madagascariensis*.—John M. Fogg, Jr.

5511. DANSER, B. H. De Nederlandsche Rumexbastaarden. [Rumex hybrids of the Netherlands.] Nederland. Kruidk. Arch. 1922: 175-209. 1 fig. 1922 [1923].—A description is given of 8 *Rumex* hybrids which were collected in the Netherlands.—J. C. Th. Uphof.

5512. ENGLER, A. Guttiferae andinae, imprimis Weberbauerianae. [Andean Guttiferae, mostly of Weberbauer.] Bot. Jahrb. 58, Beiblatt 130: 1-10. 1923.—The following species are described as new: *Vismia pozuzoensis*, *Clusia Uleana*, *C. sandiensi*, *C. ducuioides*, *C. carinata*, *C. flaviflora*, *C. Weberbaueri*, *C. cajamarcensis*, *C. loretensis*, *C. tarmensis*, *Oedematopus Weberbaueri*, *O. congestiflorus*, *Tovomita longicuneata*, *T. chachapoyasensis*, *T. Weberbaueri*, *T. Pittieri*, *Chrysochlamys Weberbaueri*, *C. micrantha*, *C. Ulei*, and *Rheedia Tonduziana*.—K. M. Wiegand.

5513. FLEISCHMANN, H. Neue Ophrys-Arten aus Asien. [New species of Ophrys from Asia.] Ann. Naturh. Mus. Wien 36: 7-14. 1923.—The following new species are described and credited to Fleischmann and Bornmüller: *O. Carmeli*, Mt. Carmel, Palestine, Bornmüller 1490; *O. Phrygia*, Sultandagh, Palestine, Bornmüller 5574; *O. Sintenisii*, northern Persia, Sintenis 1514, Palestine, Bornmüller 1490, 1492, 1492b; *O. galilaea*, Galilee, Bornmüller 1489; *O. Straussii*, Persia, Strauss.—A. S. Hitchcock.

5514. FRIES, THORE C. E. Die Alchemilla-Arten des Kenia, Mt. Aberdare und Mt. Elgon. [The species of *Alchemilla* on Kenia, Mt. Aberdare and Mt. Elgon.] Arkiv för Bot. 18¹¹: 1-47. 1923.—The author does not accept Engler's and de Wildeman's classification of the African *Alchemillas* as based on phylogenetic relationships and tries to make a new and more natural grouping of the African species of this genus. He classifies these species in 2 larger groups, *Erosulatae subochreateae* and *Rosulatae non ochreateae*. The former group consists of 6 types, the *Argyrophylla*-, *Johnstoni*-, *Hageniae*-, *Ellenbeckii*-, *Mildbraedii*- and *Rothii*-types; the latter group consists of 5 types, the *Capensis*-, *Cryptantha*-, *Pedata*-, *Fischeri*- and *Natalensis*-types. Each of these types has, as a rule, a restricted geographical distribution and the whole genus seems to have 2 centres in Africa, one in Abyssinia including the Galla uplands, East- and Central-Africa, and the other in South-Africa. The really alpine species are endemic on their respective mountains. In the descriptive part of the work Engler's and de Wildeman's classification is, however, used. Keys are given for the different sections and the

following new species, combinations, and varieties are described: *Alchemilla Roberti*, *A. Ram-mellii*, *A. De Wildemani*, *A. Pickwellii*, *A. Hillii*, *A. palustris*, *A. pentagona*, *A. Lindblomiana* (*A. Johnstoni* Oliv. var. *Lindblomiana* Mildbraed), *A. pseudomildbraedii*, *A. Hageniae*, *A. gracilipes* Engl. var. *Lovenii*, *A. bambuseti*, *A. Steudneri*, *A. Saltimae*, and *A. cyclophylla*.—*O. Heilborn*.

5515. FRIES, THORE C. E. *Zwei neue Riesen-Senecionen aus Afrika*. [Two new giant *Senecios* from Africa.] *Svensk Bot. Tidskr.* 17: 228-230. 1923.—*Senecio elgonensis* and *S. alticola* (*S. Ericsi-Roseni* var. *alticola* Mildbr.), both from high mountains in tropical Africa, are described as new. There are now 12 species of giant *Senecios* known from tropical Africa.—*O. Heilborn*.

5516. GAGNEPAIN, F. *Lythracees*. In: LECOMTE, H. *Fl. Indo-Chine* 2: 937-976. *Fig. 101-106*. May, 1921.—The genera from *Lagerstroemia* to *Rotala* are treated. The following new varieties are included: *Lagerstroemia intermedia* Koehne var. *oblonga* Craib., *Rotala leptopetala* Koehne vars. *pentamera* Koehne and *rigidula*.—*Fanny Fern Smith*.

5517. GAGNEPAIN, F. *Oenothéracées, Samydacées, Homaliacées, Passifloracées, Cucurbitacées, Begoniacées, Datisacées et Ficoides*. In: LECOMTE, H. *Fl. Indo-Chine* 2: 981-1132. *Fig. 107-134*. Oct., 1921.—In his treatment of these families, the author includes the following new species, varieties, and names: *Trapa Maximoviczii* S. Korsh. var. *tonkinensis*; *Caesaria Balansae* Gagnep. var. *cuneifolia*; *C. polyantha* Merrill. var. *glabriflora*; *Homalium Griffithianum* Kurz vars. *glabrum* and *cambodianum*; *Passiflora Eberhardtii*; *P. octandra* Gagnep. vars. *cochinchinensis*, *attopensis* and *glaberrima*; *Adenia pinnatisecta* (Modecca *pinnatisecta* Craib.); *Gymnopetalum cochinchinensis* Kurz var. *incisa*; *Melathria leucocarpa* Cogn. var. *rubella*; *Luffa cylindrica* Roem. var. *insularum* Cogn.; *Gynostemma pedata* Bl. var. *pubescens*; *Gomphogyne Alleizettei*; *Begonia sootepensis* Craib. var. *Thorelii*; *B. integrifolia* Dolz. var. *guttata* (*B. guttata* Wall.); *B. Porteri* H. Lév. & Vant. var. *macrorrhiza*.—*Fanny Fern Smith*.

5518. GAGNEPAIN, F., ET A. GUILLAUMIN. *Punicacées*. In: LECOMTE, H. *Fl. Indo-Chine* 2: 976-980. 1921.—The authors consider the genera *Punica*, *Duabangia*, and *Sonneratia*. No new species, varieties, or combinations are included.—*Fanny Fern Smith*.

5519. GLEISBERG, W. *Vaccinium Oxycoccus L., ein weiterer Beitrag zur Typenfrage der Art*. [Vaccinium Oxycoccus L., a contribution to the question of the species type.] *Ber. Deutsch. Bot. Ges.* 40: 130-139. *Fig. 1-4*. 1922.—This is a preliminary treatment of the varieties and forms of *V. Oxycoccus* found in the bogs of Germany. This work, which is the result of a study of herbarium material and living plants, is based primarily upon fruit and leaf characteristics and general habit of the plants.—*W. C. Muenscher*.

5520. GUILLAUMIN, A. *Mélastomacées*. In: LECOMTE, H. *Fl. Indo-Chine* 2: 864-936. *Fig. 96-100*. May, 1921.—The author treats the genera from *Osbeckia* to *Memecylon*. The following new species, varieties, and forms are included: *Osbeckia annamica*, *Melastoma Eberhardtii*, *M. Chevalieri*, *Blastus Eberhardtii*, *Anerincleistus sessilifolius*, *A. roseus*, *A. blastifolius*, *Sonerila rivularis* Cogn. f. *guttata*, *Medinilla Spirei*, *M. caerulea*, *M. marumiaetricha*, *Memecylon Geoffrayi*, *M. langbianense*, *M. Harmandii*, *M. Chevalieri*, and *M. Chevalieri* var. *lanceolata*.—*Fanny Fern Smith*.

5521. HITCHCOCK, A. S. *New species of grasses from South America*. *Proc. Biol. Soc. Washington* [D. C.] 36: 195-198. 1923.—*Bromus villosissimus*, *Lamprothyrsus peruvianus*, *Stipa Featherstonei*, *S. Macbridei*, from Peru; and *Chloris Luetzelburgii* from Brazil, are described.—*J. C. Gilman*.

5522. JUELLE, HENRI. *Les Cytinus de Madagascar*. *Compt. Rend. Acad. Sci. Paris* 177: 1431-1435. 1923.—*C. Baroni* Baker f., *C. malagasicus* Jumelle & Perrier, and *C. glandulosus* are noted, all phanerogamic parasites. Vegetative parts, flowers and fruits are described.—*C. H. Farr*.

5523. KRÄNZLIN, FR. *Über zwei Polystachya-Arten*. [On 2 species of *Polystachya*.] *Ann. Naturh. Mus. Wien* 36: 5-6. 1923.—This includes remarks on *P. Fischeri* Reichb. f. and the description of *P. Hildebrandtii* Kränzlin, n. sp. from Madagascar (*Hildebrandt* 4222).—*A. S. Hitchcock*.

5524. KRÄNZLIN, FR. *Zur Nomenklatur von Polystachya luteola Hook*. [On the nomenclature of *Polystachya luteola* Hook.] *Ann. Naturh. Mus. Wien* 36: 150-151. 1923.—The author discusses the supposed synonym *Epidendrum minutum* Aubl. but rejects it because of insufficient description.—*A. S. Hitchcock*.

5525. KRAUSE, K. Die Sapotaceen Papuasians. [The Sapotaceae of Papuaasia.] Bot. Jahrb. 58: 463-487. 1923.—In Papuaasia 8 genera and 47 species of Sapotaceae are now known; most of these are restricted to New Guinea and the neighboring islands, few being of wide distribution. Of the 47 species 28 are new. The Sapotaceae are mostly coastal with only a few on the highlands. The following species and combinations are proposed as new: *Illipe Mentzelii* (*Payena Mentzelii* K. Sch.), *I. macropoda*, *I. Schlechteri*, *I. pachyphylla*, *I. leucodermis*, *Paluquium inutile* Schltr., *P. densivenium*, *P. montanum* Schltr., *P. Warburgianum* Schltr., *P. Ledermannii*, *P. tenuifolium*, *Sideroxylon rigidifolium*, *S. spathulatum*, *S. patentinervium*, *S. polyneurum*, *S. Ledermannii*, *S. densinervium*, *S. tenuipes*, *S. Peekelii*, *S. garcinioides*, *S. Schlechteri*, *S. albocostatum*, *S. maluense*, *S. acutum*, *S. confertum*, *S. kaniense*, *S. lamprophyllum*, *S. monticolum*, *Beauwisagea Schlechteri*, *Beccariella Schlechteri*, *Chrysophyllum torulosum*, *C. Ledermannii*, and *C. brevicaulis*.—K. M. Wiegand.

5526. LECOMTE, H. Quelques Sapotacées nouvelles d'Afrique et de Madagascar. [Some new Sapotaceae from Africa and Madagascar.] Bull. Mus. Hist. Nat. [Paris] 26: 647-649. 1920.—The author corrects the synonymy of, and completely describes, a manuscript species of Pierre: *Manilkara Maclaudii* Pierre (*Mimusops Schweinfurthii* Engl. var. *Chevalieri* Duhard), and *M. Maclaudii* var. *membranacea* Pierre. The following new species are also described: *Donnella parvifolia*, *Sideroxylon betsimisarakum*, *Gambeya madagascariensis*.—John M. Fogg, Jr.

5527. MALME, GUST. O. Desmodii species in Herbario Regnelliano asservatae. [Species of Desmodium in the Regnellian herbarium.] Arkiv för Bot. 187: 1-20. Pl. 1-4. 1922.—The work deals with 24 species of which the following are new: *D. subsericeum*, *D. triarticulatum*, *D. Dutrae*, *D. subsimplex* (*D. pachyrhizum* Vog. ? *subsimplex* Benth.), *D. pabulare* (*Meibomia pabularis* Hoehne), and *D. glabrescens*. A key is given of the "species brasilienses foliis unifoliolatis."—O. Heilborn.

5528. MERRILL, E. D. Plants from Banguay Island. Philippine Jour. Sci. 24: 113-116. 1924.—Twenty-six species are enumerated from this land, which is situated off the northeast corner of Borneo. The flora is apparently intermediate between that of Borneo and that of Palawan in the Philippine group. New forms described are *Calamus javensis* Blume var. *Woodii* and *Antidesma banguayense*.—Author.

5529. MEZ, CARL. Stylagrostis, novum Graminearum genus. [Stylagrostis, a new genus of the Gramineae.] Bot. Archiv 1: 20. 1922.—Fourteen species of *Stylagrostis*, formerly in the genera *Deyeuxia*, *Calamagrostis*, and *Agrostis*, are listed. The new combinations with name-carrying synonyms are: *Stylagrostis nivalis* (*Deyeuxia nivalis* Wedd.), *S. erythrostachya* (*D. erythrostachya* Desv.), *S. phalaroides* (*D. phalaroides* Wedd.), *S. chrysostachya* (*D. chrysostachya* Desv.), *S. ovata* (*D. ovata* Presl), *S. chrysantha* (*D. chrysanthe* Presl), *S. laxiflora* (*D. laxiflora* Phil.), *S. leiopoda* (*D. leiopoda* Wedd.), *S. polystachya* (*D. polystachya* Wedd.), *S. elegans* (*D. elegans* Wedd.), *S. eminens* (*D. eminens* Presl), *S. robusta* (*D. robusta* Phil.), *S. fulva* (*Agrostis fulva* Griseb.), *S. longigluma* (*Calamagrostis longigluma* Pilg.).—William Seifriz.

5530. NAKAI, T. Ehretiae quaedam novae asiaticae. [Some new Asiatic Ehretias.] Jour. Arnold Arboretum 5: 36-41. 1924.—*Ehretia acuminata* R. Br., usually considered a polymorphous species of wide distribution, is discussed and restricted to Australia, and a key to the group of species closely related to *E. acuminata* is given, followed by an enumeration of the species with citation of literature, synonyms and specimens. *Ehretia Dicksoni* Hance is maintained as distinct from *E. macrophylla* Wall. The following species and several varieties are new: *E. taiwaniana*, *E. Dicksoni* Hance vars. *typica*, *glabrescens*, *liukuensis*, *japonica*, and *tomentosa* (Gagnep. & Courch.).—Alfred Rehder.

5531. NELSON, C. Z. Studies of North American Opuntia. Trans. Illinois Acad. Sci. 12: 119-125. 1919.—*O. Youngi*, *O. seguina*, *O. longilochia*, and *O. Shreveana* are described as new species and notes are given on the occurrence of *O. Tuna* Mill., *O. Pes-corvi* Lecomte, *O. Pollardi* Britt. & Rose, *O. Tracyi* Britt., *O. humifusa* Raf., *O. fragilis* Haw., *O. arizonica* Griffiths, *O. microcarpa* K. Schum., and *O. Toumeyi* Rose.—Geo. D. Fuller.

5532. PAX, F. UND K. HOFFMANN. Euphorbiceae africanae. [Euphorbiaceae of Africa.] Bot. Jahrb. 58, Beiblatt 130: 39-40. 1923.—The following are described as new: *Discocla oxylon occidentale* (Müll. Arg.) Pax & K. Hoffm. var. *pubescens*, *Alchornea Mildbraedii*, and *Macaranga ebolowana*.—K. M. Wiegand.

5533. PERRIER DE LA BATHIE, HENRI. Un nouveau genre de Chlaenacées. [A new genus of Chlaenaceae.] Bull. Mus. Hist. Nat. [Paris] 26: 668-669. 1920.—*Pentachlaena* n. gen. is described. It resembles *Xyloolena* and *Eremolena*, in having the 2 outer of its 5 sepals reduced to bracts, but differs from them in that it has a 5-valved ovary and a 5-valved loculicidal capsule. This places it near the Tiliaceae, from which family the Chlaenaceae are separated by the imbrication of the sepals, and the presence of an involucre and an independent disc outside the free stamens. *Pentachlaena* conforms to these requirements, though departing from the types furnished by the 7 other genera of the Chlaenaceae. *P. latifolia* is described as a new species from Madagascar.—John M. Fogg, Jr.

5534. PITARD, J. Rubiacées. In: LECOMTE, H. Fl. Indo-Chine 3: 145-288. Fig. 15-24. August, 1923.—In the present number the author completes the treatment of the genus *Oldenlandia* and continues through the genera *Timonius* and *Knoxia* in part. The following new genera, species, varieties, and combinations are included: *Oldenlandia labialis* Pierre, *O. racemosa* Pierre (*Hedyotis racemosa* Lam.), *O. dimorpha* (H. *dimorpha* Craib.), *Ophiorrhiza Harrisiana* Heyne var. *condorensis*, *O. tonkinensis* (*O. ochroleuca* Drake), *O. annamica*, *Carlemannia tetragona* Hook. var. *tonkinensis* (*C. tetragona* Drake), *Keenania microcephala*, *Musaenda dinhensis* Pierre, *M. hilaris* Pierre, *M. Bonii*, *M. Chevalieri*, *M. theifera* Pierre, *M. theifera* Pierre vars. *suffruticosa* and *laotica*, *M. aptera*, *M. saigonensis* Pierre, *M. subsessilis* Pierre, *M. Thorelii*, *M. cambodiana* Pierre, *M. cambodiana* Pierre var. *annamensis*, *M. hoensis* Pierre, *Myrioneuron nutans* Wall. var. *effusa* (*M. nutans* Drake), *M. tonkinense*, *M. pubifolium*, *Mycetia cauliflora* Miq. var. *tenuipes*, *M. squamulosopilosa*, *Urophyllum argenteum*, *U. longifolium* Wight var. *annamense* Pierre, *U. tonkinense*, *U. Lecomtei*, *Tarenna tonkinensis*, *T. disperma* (*Webera disperma* Hook.), *T. citrina*, *T. Chevalieri*, *T. Thorelii*, *T. baviensis* (*Izora baviensis* Drake), *T. Harmandiana*, *T. hoensis*, *T. Bonii*, *T. capitata*, *T. latifolia*, *T. membranacea*, *T. annamensis*, *T. quocensis*, *T. quocensis* var. *laotica*, *T. Wallichii* (*Webera Wallichii* Hook.), *T. Wallichii* var. *angustata* Pierre, *Randia fasciculata* DC. vars. *velutina* Pierre, *multiflora* and *indica*, *R. longiflora* Lam. vars. *horrida* Pierre (*Oryceras horrida* Lour.), *ovoidea*, and *Harmandiana*, *R. hoensis* Pierre, *R. ovoidea* Pierre, *R. ovoidea* Pierre var. *parvifolia*, *R. Pierrei*, *R. stenantha* Drake var. *tomentosa*, *R. canthioides* Champ. var. *macrophylla*, *R. densiflora* Benth. var. *tonkinensis*, *R. oxyodonta* Drake var. *microdonta*, *R. pycnantha* Drake var. *grandiflora*, *R. caudatifolia*, *R. exaltata* Griff. var. *Griffithiana* Pierre, *R. atlopevensis*, *Gardenia cambodiana*, *G. angkorensis*, *G. Philastreii* Pierre, *G. annamensis*, *G. Chevalieri*, *G. tubifera* Wall. var. *costulata*, *G. panduriformis* Pierre, *G. tonkinensis*, *Morindopsis laotica*, *Hypobathrum hoense* Pierre, *Xantonnea* Pierre n. gen., *X. coffeoides* Pierre, *X. coffeoides* Pierre var. *salicifolia* Pierre, *X. quocensis* Pierre, *Xantonneopsis* n. gen., *X. Robinsoni*, *Alleizettella* n. gen., *A. rubra*, *Knoxia congesta*, *K. valerianoides* Thorel.—Fanny Fern Smith.

5535. REHDER, ALFRED. New species, varieties and combinations from the herbarium and the collections of the Arnold Arboretum. Jour. Arnold Arboretum 5: 49-59. 1924.—The nomenclature of the genus *Xolisma* Raf. (*Lyonia* Nutt.) and the characters which distinguish it from the genus *Pieris* are discussed, and its division into 4 sections proposed. There are also notes on a few other Ericaceae and on *Viburnum*. The following are the new combinations, varieties and forms recorded: *Xolisma lucida* (Lam.), *X. mariana* (L.) f. *vestita*, *X. ovalifolia* (Wall.) vars. *lanceolata* (Wall.) and *elliptica* (Sieb. & Zucc.), *X. villosa* (Wall.) var. *pubescens* (Franch.), *X. compta* (W. W. Sm. & J. F. Jeffrey), *Andromeda glaucophylla* Link. f. *latifolia* (Ait.), \times *Erica Mackaii* Hook. var. *Watsonii* (Benth.), *Vaccinium japonicum* Miq. var. *sinicum* (Nakai), *Viburnum molle* Michx. f. *leiophyllum*, *V. pubescens* Pursh vars. *Deami* and *indianense*.—Alfred Rehder.

5536. SARGENT, C. S. Notes on North American trees, XII. Jour. Arnold Arboretum 5: 41-49. 1924.—This part deals with the genus *Aesculus*. The following combinations, varieties, and hybrids are new: *Aesculus glabra* var. *monticola*, *A. octandra* var. *vestita*, *A. neglecta* Lindl. vars. *georgiana* (*A. georgiana* Sarg.), *pubescens* (Sarg.), *tomentosa* and *lanceolata* (Sarg.), \times *A. arnoldiana* (*A. glabra* \times *hybrida*), \times *A. DuPontii* (*A. neglecta* \times *Pavia*) and var. *Hessei*, \times *A. mutabilis* Schelle vars. *penduliflora* and *induta*.—Alfred Rehder.

5537. SCHEWE, O. Neue Cinnamomum-Arten aus Neu-Guinea. [New species of Cinnamomum from New Guinea.] Bot. Jahrb. 58: 492-495. 1923.—The following species and varieties are described as new: *Cinnamomum Ledermannii*, *C. massoia* and var. *rotundatum*, *C. Englerianum*, *C. Gilgianum*, and *C. piniodorum*.—K. M. Wiegand.

5538. SCHICK, C. Neue Kakteen aus der Sierra de Cordoba. [New Cactus plants from the Sierra de Cordoba.] Möllers Deutsch. Gärtnerzeitg. 38: 201-222. 2 fig. 1923.—The following species from Argentina are described as new: *Echinocactus Sigelianus*, *E. Sutterianus*, and *E. capillensis*.—J. C. Th. Uphof.

5539. SCHISCHKIN, B. Contribution à l'étude des plantes nouvelles, rares et critiques de la Caucasic. [Contribution to the study of new, rare, and critical plants of the Caucasus.] Bull. Mus. de Géorgie 1: 1-24. Pl. 1-4. 1922.—The descriptions are in Latin, the discussions in Russian. The new species are: *Melica atropatana*; *Nardurus Woronowii*; *Silene talyschensis*; *S. Marcowiczii*; *S. propinqua*; *S. longidens*; *S. euxina* Rupr. var. *Tchihatchevii*.—A. Chase.

5540. SCHLECHTER, R. Gesneriaceae papuanae. Bot. Jahrb. 58: 255-379. Fig. 1-11. 1923.—This is a very comprehensive treatment of the 12 genera and 171 species found in Papuasias to date. This region is an important center for the family. Here as elsewhere the species are generally restricted or local. They are typically forest plants. New characters have been found and a new treatment proposed. The stigma especially has been found important. Collectors are urged to obtain fruit wherever possible. Keys, discussions, notes, synonymy, and distribution are given. The following new species, varieties, combinations and names are proposed: *Boea Warburgii*, *B. mollis*, *Aeschynanthus ligustrinus*, *A. dischorensis*, *A. stenosphon*, *A. roseus*, *A. torricellensis*, *A. rarus*, *A. phaeotrichus*, *A. calanthus*, *A. mollis*, *A. impar*, *A. sanguineus*, *A. atrorubens*, *A. flammeus*, *A. varianis*, *A. hispidus*, *A. myrtifolius*, *A. pachyanthus*, *Euthamnus papuanus*, *Dichrotrichum lobatum* and var. *brachypus*, *D. villosum*, *D. Schultzzei*, *D. torricellense*, *D. chrysostylum*, *D. magnificum*, *Rhynchoglossum Papuae*, *Monophyllaea Finisterrae*, *Rhyncholechum polycarpum* (*Cryptandra polycarpa* K. Sch.), *Sepikea cylindrocarpa*, *Cyrtandra malaccocarulos*, *C. Heineana*, *C. rhabdothermum*, *C. phaeodictyon*, *C. Ledermannii*, *C. lasiogynae*, *C. saxicola*, *C. megalocalyx*, *C. Jadunae*, *C. kaniensis*, *C. montigena*, *C. hedraiantha*, *C. Schultzzei*, *C. bismarckiensis*, *C. ceratocalyx* K. Sch. var. *umbraticola*, *C. begonioides*, *C. nodulosa*, *C. rhizantha*, *C. amplifolia*, *C. umbraticola*, *C. dolichocalyx*, *C. elata*, *C. Stolleana*, *C. confusa* (*C. bracteata* Lautb.), *C. minjemensis*, *C. Behrmanniana*, *C. Detzneriana*, *C. gorumensis*, *C. Schumanniana*, *C. bullata*, *C. sororia* (*C. monticola* Lautb.), *C. hispidissima*, *C. sagetorum*, *C. sepikana*, *C. wariana*, *C. Buergersiana*, *C. glabrata*, *C. lithophila*, *C. virescens*, *Cyrtandropsis Finisterrae*, *C. villosa*, *C. phaeotricha*, *C. Ledermannii*, *C. congesta*, *C. macrophylla*, *C. djamuensis*, *C. epiphytica*, *C. bismarckiensis*, *C. sphaerocalyx* (*Cyrtandra sphaerocalyx* K. Sch.), *C. subintegra*, *C. longifolia*, *C. inflata*, and *C. acutiserrata*. Many more species are given as though previously undescribed, but no Latin diagnoses are here given and in most cases only a few notes. The intention of the author is not clear. Two genera, *Euthamnus* and *Sepikea*, are described as new.—K. M. Wiegand.

5541. SCHMIDT, OTTO CHR. Neue Aristolochiaceen Papuasiens. [New Aristolochiaceae from Papuasias.] Bot. Jahrb. 58: 488-491. 1923.—The number of known species of this family in Papuasias is 16, all belonging to the genus *Aristolochia*. The following are described as new: *Aristolochia Lauterbachiana*, *A. novoguineensis*, *A. Ledermannii*, *A. Dielsiana*, *A. gracilifolia*, and *A. crassinervia*.—K. M. Wiegand.

5542. SMITH, J. J. Orchidaceae novae Malayenses. X. [New Malayan orchids. X.] Bull. Jard. Bot. Buitenzorg III, 5: 12-102. 1922.—In this part the following new species and varieties are described: *Peristylus tobensis*, *Platanthera angustata* Lindl. var. *singgalangensis*, *Cryptostylis conspicua* J. J. S. var. *sumatrana*, *Aphyllorchis sumatrana*, *Galeola ternatensis*, *Erythrodus amboinensis* (*Physurus herpysmoides* K. & P. var. *amboinensis* J. J. S.), *E. brevicarcalcar*, *Anoectochilus longicalcaratus*, *Cystorchis appendiculata*, *C. aberrans*, *Hetaeria rostrata*, *Goodyera Gibbsiae*, *Tainia sumatrana*, *T. tenera*, *Coelogyne malintangensis*, *C. Buennemeyeri*, *Dendrochilum alborivide*, *D. korintjiense*, *D. complectens*, *D. acuminatum* J. J. S. var. *laxum*, *D. longicaule*, *D. adpressibulbum*, *D. ramosissimum* (*Platyclinis ramosissimum* Ridl.), *D. decipiens*, *D. latilobum*, *D. duplicibrachium*, *D. ventricosum*, *D. rigidulum*, *D. ophiopogonoides* and var. *merapiense*, *D. ovatum*, *D. talamuense*, *D. appendiculatum*, *D. lamellatum*, *D. fruticicola*, *D. insectiferum* (Ridl.), *D. furfuraceum*, *D. basale*, *D. papillosum*, *D. liparidiflorum*, *D. pholidotoides*, *Microstylis ternatensis*, *Podochilus forficuloides*, *Appendicula Theunissenii*, *A. kinabaluensis* (*Chilopogon kinabaluense* Ames), *Arundina revoluta* Hook. f. var. *borneensis*, *Calanthe aureiflora*, *C. clavicarcalcar*, *C. veratrifolia* R. Br. var. *dupliciloba*, *C. transiens*, *Eulophia bicolor* Bl. var. *celebica*, *Eria oblitterata* Rehb. f. var. *sumatrana*, *E. erosula*, *E. purpureocentrum*, *E.*

petiolata, *Dendrobium sacculiferum*, *D. Hagerupii*, *D. Dammerboerii*, *D. siberutense*, *D. pedicellatum* J. J. S. var. *oblongum*, *D. ventrilabium*, *D. transtilliferum*, *D. quadrialatum*, *D. inopinatum*, *D. crepidiferum*, *D. batakense*, *Bulbophyllum linggense*, *B. languidum*, *B. perductum* J. J. S. var. *sebesiense*, *Sarcochilus clausus*, *Cordioglottis* n. gen., *C. Westenenkii*, *Thrixspermum longipilosum* and var. *korintjiense*, *Microsaccus dempoensis*, *M. ampullaceus*, *M. albobirescens*.—*Alfred Rehder*.

5543. SMITH, J. J. *Tafeln javanischer Orchideen*. [Plates of Javanese orchids.] Bull. Jard. Bot. Buitenzorg III, 5: 245. Pl. 18-37. 1922.—The plates represent analytical figures (several on each plate) of orchids described by the author in the supplements to *Die Orchideen von Java*.—*A. Rehder*.

5544. TESCHNER, H. *Die Lauraceen Nordöst-Neu-Guineas*. [The Lauraceae of north-east New Guinea.] Bot. Jahrb. 58: 380-440. 1 fig. 1923.—The treatment includes 10 genera and 81 species, 76 of which are new to science, and is restricted to the portion of New Guinea formerly under German rule. The species have narrow ranges and there is a high degree of endemism. Keys, distribution, synonymy, and other notes are given. The following species, varieties, and combinations are proposed as new: *Phoebe novo-guineensis*, *Actinodaphne tomentosa*, *A. nitida*, *A. latifolia*, *A. caesia*, *A. obtusa*, *A. Engleriana*, *A. pulchra*, *A. Ledermannii*, *A. novo-guineensis*, *A. densiflora*, *Tetradenia longifolia*, *T. Melchioriana*, *T. Clarissae* and var. *pulchra*, *T. minor*, *T. latifolia*, *T. pubescens*, *T. acuta*, *T. glabra*, *T. acuminata*, *T. novo-guineensis*, *Litsea Dielsiana*, *L. Caroli*, *L. minor*, *L. maluensis*, *L. Gilgiana*, *L. kauloënsis*, *L. Ledermannii*, *L. grandifolia*, *L. novo-guineensis*, *L. Engleriana*, *L. Schlechteri*, *Beilschmiedia longifolia*, *B. lanuginosa*, *B. triplinervis*, *B. Tesselendorffiana*, *B. Ledermannii*, *B. novo-guineensis*, *B. pubescens*, *B. sericea*, *B. Dielsiana*, *B. acutifolia*, *Cryptocarya multipaniculata*, *C. multinervis*, *C. magnifolia*, *C. verrucosa*, *C. Engleriana*, *C. fuscopilosa*, *C. pusilla*, *C. Ledermannii*, *C. ovata*, *C. kamanar*, *C. Graebneriana*, *C. tebaënsis*, *C. pulchella*, *C. Schlechteri*, *C. caudata*, *C. novo-guineensis*, *Pseudocryptocarya pauciflora* (*Cryptocarya pauciflora* Lauterb.), *Endiandra flavinervis*, *E. microphylla*, *E. Ledermannii*, *E. fulva*, *E. asymmetrica*, *E. ferruginea*, *E. grandifolia*, *E. Dielsiana*, *E. acuminata*, *E. oblonga*, *E. multiflora*, *E. Schlechteri*, and *E. Engleriana*. The genus *Pseudocryptocarya* is proposed as new. A chapter is devoted to the anatomical peculiarities of the Lauraceae, especially those of value in classification. Of notable importance is the variation in thickness of the epidermis, which, however, bears no relation to the variation in climate. The cells of the epidermis are often characteristic. The lower epidermis is more uniform and is always 1 cell in thickness. The stomates are very uniform in structure. The hairs are never glandular and are 1-celled. Sclerids are not found in the mesophyll. Resin cells occur in some species but not slime cells. Acicular or fusiform crystals of calcium oxalate are frequent. Following the discussion of anatomy is one on the validity of the genera *Actinodaphne* Nees, *Tetradenia* Nees, and *Litsea* Lam. The geographical distribution of the Lauraceae of New Guinea is discussed. The Malay Peninsula is held to have been the center from which migration took place in many directions, among them, New Guinea. From New Guinea there was migration toward New Zealand. A table summarizing the distribution of the 6 principal genera of New Guinea in other countries is given.—*K. M. Wiegand*.

5545. VALETON, T. *Alpinia Hulstijnii* Val. nov. spec. (Zingiberaceae). Bull. Jard. Bot. Buitenzorg III, 5: 343-345. Pl. 39. 1923.—The new species, a native of the island Sulabesi, east of Celebes, is described from plants cultivated in the Botanic Garden at Buitenzorg.—*A. Rehder*.

5546. VALETON, T. A new Philippine *Bikkia*. Philippine Jour. Sci. 23: 573-574. 1924.—*Bikkia philippinensis* is described as new.—*E. D. Merrill*.

5547. VALETON, T. *Phrynium obscurum* T. & B., eine noch unvollständig bekannte Marantaceae. [Phrynium obscurum T. & B., a yet incompletely known Marantaceae.] Bull. Jard. Bot. Buitenzorg III, 5: 339-342. Pl. 38, fig. 14-17. 1923.—A detailed description of the plant in Latin and German is given.—*A. Rehder*.

5548. WILDEMAN, É. DE. *Plantae Bequaertianae*. Études sur les récoltes botaniques du Dr. J. Bequaert chargé de missions au Congo Belge (1913-1915). [Studies of the botanical collections of Dr. J. Bequaert in charge of the expeditions to Belgian Congo.] Small 8 vo. Fasc. 1. 166 p. Maison d'Éditions et d'Impressions, Anc. Ad. Hoste, S. A.: Gand, 1921.—The author in a brief introduction gives an account of the expeditions of Bequaert to the

Congo. In the enumeration and description of plants, observations are added. The genus *Bulbophyllum* is given special study, and a geographical tabulation and key precedes the description of species. Two subgenera are recognized in this genus, namely, *Megaclinium* and *Eubulbophyllum*. The genus *Vanilla* also receives special study and is provided with a key to the species. The following new species, combinations, names, and varieties are included: *Anthericum Laurentii* De Wild. var. *minor*, *Chlorophytum beniense*, *C. Bequaerti*, *C. elongatofusiforme*, *C. ituriense*, *C. butaguense*, *C. semlikiense*, *Aloe angiensis*, *A. beniensis*, *A. Bequaerti*, *A. lanuriensis*, *A. Sereti*, *A. termetophylla*, *Urginea Bequaerti*, *Dracaena Bequaerti*, *Sansevieria Bequaerti*, *Asparagus subfalcatus*, *Haemanthus Bequaerti*, *Crinum Bequaerti*, *Hypoxis Bequaerti*, *Aristea cyanea*, *Bulbophyllum Arnoldianum*, *B. Chevalieri*, *B. congolense*, *B. djumaense*, *B. djumaense* var. *grandifolium*, *B. eburneum*, *B. Fuerstenbergianum*, *B. Gilletii*, *B. Imschootianum*, *B. kewense* Schlechter var. *purpureum*, *B. Ledermannii*, *B. lubiense*, *B. minus*, *B. oxypterum* (Lindl.) Rehb. f. var. *mozambicense* (Finet), *B. Pobequini* (Finet), *B. pusillum* (Rolfe), *B. Renkinianum* (Laurent), *B. ugandae* (Rolfe), *B. acutebracteatum*, *B. Buchenawianum* Kränzl., *B. elongatum*, *B. Kraenzlinianum*, *B. Schlechteri*, *Celosia argentea* L. var. *cristata* (*C. cristata* L.), and *Maesa serrato-dentata*.—*IBID.* Fasc. 2. P. 167–297. A. Buyens: Gand; Jacques Lechevalier: Paris, March, 1922.—The genus *Alchemilla* is given special study and is provided with a key to the species. The following new species, combinations, and varieties are included: *Culcasia Bequaerti*, *C. kasaiensis*, *C. Pynaerti*, *C. Sapini*, *C. Sereti*, *Amorphophallus Bequaerti*, *Cerastium Schimperii* (*Stellaria Schimperii* Engler), *Capparis Bequaerti*, *C. subtomentosa*, *Maerua Bequaerti*, *M. Bequaerti*, var. *variifolia*, *Acridocarpus Goossensi*, *Icacina Claessensi*, and *Lobelia Mearnsi*.—L. M. Stupp.

REVISIONS AND MONOGRAPHS

5549. BECCARI, ODOARDO. *Palme della tribù Borasseae*. [Palms of the tribe Borasseae. *Folio*. Fasc. 1. P. 1–16, pl. 1–7, 11 fig. G. Passeri: Florence, 1924.—This is a posthumous work of O. Beccari, edited by UGO LINO MARTELLI. The 1st fascicle contains a characterization of the tribe, a conspectus of the genera, and a key to the species of *Borassus* and *Latania*. Generic and specific descriptions, as well as synonymy and bibliography, are given in detail. The following species are included, several of which are illustrated: *Borassus flabellifer* L., *B. sundaica* Becc., *B. aethiopum* Mart. and vars. *senegalensis* Becc. and *begamojensis* Becc., *B. sambiranensis* Jum. & Perr., *B. Deleb* Becc., *B. madagascariensis* Bojer, *B. Heineana* Becc., *Lodoicea sechellarum* Labill., *Borassodendron Machadonis* Becc., *Latania Commersonii* L., *L. Verschaaffeltii* Lemaire, and *L. Loddigesii* Mart.—J. M. Greenman.

5550. BUSCALIONI, LUIGI, E GIUSEPPE MUSCATELLO. *Studio monografico sulle specie americane del gen. "Saurauia Willd."* [Monograph of American species of the genus *Saurauia*.] *Malpighia* 29: 319–366. 1922.—The different species are described and comparative tables are given to show the distinctions between closely allied forms.—Lillian C. Cash.

5551. CAMMERLOHER, H. *Index Loganiacearum et Buddleiacearum, quae anno 1922 in Horto Botanica Bogoriensi coluntur*. *Bull. Jard. Bot. Buitenzorg* III, 5: 103–104. 1922.

5552. CAMMERLOHER, H. *Die Loganiaceen und Buddleiaceen Niederländisch-Indiens*. [The Loganiaceae and Buddleiaceae of the Dutch East Indies.] *Bull. Jard. Bot. Buitenzorg* III, 5: 294–338. 10 fig. 1923.—The enumeration of the species is preceded by a key to the genera of Loganiaceae, the Buddleiaceae being represented only by *Buddleia asiatica*. Under each species and variety the most important literature and the specimens examined are cited and in the case of the less known species supplementary descriptions and critical remarks are added, particularly in the genus *Fagraea*, which is preceded by a key to its 24 species; there is also a key to the species of *Geniostoma* and *Mitrasacme*. The following combinations, species, and varieties are new: *Mitreola paniculata* Wall. var. *ilacina* Backer, *Mitrasacme saxatilis* Backer, *Fagraea eucalyptifolia*, *F. Teysmanii*, *F. gracilis*, *F. sororia* J. J. Smith, *F. bracteosa*, and *F. lutea*.—A. Rehder.

5553. CAMUS, AIMÉE. *Note sur quelques espèces du genre Cyrtococcum Stapf*. [Some species of the genus *Cyrtococcum* Stapf (Gramineae).] *Bull. Mus. Hist. Nat. [Paris]* 27: 118. 1921.—The genus *Cyrtococcum*, founded by Stapf on *Panicum setigerum* P. B., not Retz. is made to include the entire *Gibbosae* section of the genus *Panicum* from Indo-China, India, Malay

Peninsula, Polynesia and Australia. The changes involved are as follows: *Cyrtococcum pilipes* (= *Panicum pilipes* Nees & Arn., *P. hermaphroditum* Steud., *P. oxyphyllum* Hochst., and *P. trigonum* Nees, not Retz.); *C. trigonum* (= *P. trigonum* Retz., *P. difforme* Roth., *P. gibbum* St., *P. radicans* Bühse, *P. reprens* Heyne, and *P. Burmanni* Heyne); *C. patens* (= *P. patens* L., *P. radicans* Retz., *P. obliquum* Roth, *P. accrescens* Trin., and *P. velutinum* Willd.); *C. longipes* (= *P. longipes* Wight & Arn.); *C. sparsicomum* (= *P. sparsicomum* Nees). *C. patens* also includes, as a form, *P. Warburgii* Mez (= *P. patens* Warburg & Hackel), and, as a variety, *P. Schmidtii* Hack.—John M. Fogg, Jr.

5554. GLEISBERG, W. Systematisch-kritische Vorarbeit für eine Monographie der Spezies *Vaccinium Oxycoccus* L. [Preliminary work on a monograph of *Vaccinium Oxycoccus*.] Bot. Archiv 2: 1-34. Fig. 1-7. 1922.—A critical study of the taxonomy, morphology, ecology and physiology of this species is presented.—William Seifriz.

5555. JANOWSKI, MARGARETHA. Arundinellearum, Graminum tribus, conspectus. [A conspectus of the grass tribe Arundinelleae.] Bot. Archiv 1: 21-28. 1922.—Species of the following 4 genera of the tribe Arundinelleae Mez (*Tristegineae* Nees) are listed and accompanied by keys; *Arundinella* (55 spp.), *Thysanolaena* (2 spp.), *Phaenosperma* (1 sp.), and *Beckera* (4 spp.). *Thysanolaena procera* Mez appears as a new combination, based on *Agrostis procera* Retz.—William Seifriz.

5556. LECOMTE, HENRI. Le genre *Tieghemmella* Pierre (*Dumoria* Aug. Chev.) doit être rapporté au genre *Mimusops* (Sapotacées). [Genus *Tieghemella* should be reduced to genus *Mimusops* (Sapotaceae).] Bull. Mus. Hist. Nat. [Paris] 27: 107-110. 1 pl. 1921.—The author straightens out the confused synonymy of *Tieghemella africana* Pierre (involving *Dumoria Heckelii* (Pierre) Aug. Chev., *Manilkara*, *Lecomtedoxa*, and *Baillonella*) and shows that the plant found in French Congo, and variously referred to under these names, should be called *Mimusops africana* (Pierre) H. Lec. *Tieghemella* is suggested as a section of the genus *Mimusops*.—John M. Fogg, Jr.

5557. NAKAI, T. Araliaceae Imperii Japonici. [Araliaceae of the Japanese Empire.] Jour. Arnold Arboretum 5: 1-36. 1924.—The author presents a revision of the Araliaceae of the Japanese Empire. The enumeration of species under each genus is preceded by a dichotomous key to the species and varieties, and under each accepted name literature and synonyms are cited and the specimens seen enumerated. Three new genera are proposed: *Evodiopanax*, *Boninofatsia*, and *Diplofatsia*; and the following combinations, species, varieties, and forms are new: *Acanthopanax kiusianum*, *A. koreanum*, *A. Hondae* Mats. vars. *inermis* and *amatum*, *A. commixtum*, *A. chiisanense*, *A. divaricatum* Seem. var. *inermis*, *Evodiopanax innovans* (*Panax innovans* Sieb. & Zucc.), *E. evodiaefolium* (*Acanthopanax evodiaefolium* Franch.) and var. *ferrugineum*, *Eleutherococcus hypoleucus* (*Acanthopanax hypoleucum* Mak.), *E. japonicus* (*A. japonicum* Franch. & Sav.) and f. *variegatus*, *Kalopanax ricinifolium* Miq. vars. *typicum*, *Maximowiczii* (*Aralia Maximowiczii* Van Houtte), *lutchuense* and *chinense*, *Echinopanax japonicum*, *Boninofatsia oligocarpella* (*Fatsia oligocarpa* Koidz.), *B. Wilsonii*, *Diplofatsia polycarpa* (*Fatsia polycarpa* Hay.), *Agalma taiwanianum*, *A. lutchuense*, *Boerlagiodendron kotoense* (*Osmoxylon kotoensis* Hay.), *Gilibertia morbifera* (*Dendropanax morbiferum* Lev.), *G. sinensis*, *Hedera pedunculata*, *H. formosana*, *H. japonica* Tobl. f. *variegata* and f. *argentea*, *Aralia cordata* var. *sachalinensis* (*A. racemosa* var. *sachaliensis* Regel), *A. elata* Seem. f. *variegata* (*A. chinensis* var. *variegata* Rehd.), f. *aureovariegata* (Rehd.), and var. *canescens* (Franch. & Sav.), *A. chinensis* L. var. *nuda*, *Panax japonicum* C. A. Mey. f. *typicum*, f. *trifoliolatum* (Mak.), f. *lancifolium*, f. *incisum*, f. *dichrocarpum* (Mak.), and f. *xanthocarpum* (Mak.), *Panax schin-seng* var. *coraiense* Nees f. *spontanum* and f. *cultum*.—Alfred Rehder.

5558. OTTLEY, ALICE M. A revision of the Californian species of *Lotus*. Univ. California Publ. Bot. 10: 189-305. Pl. 61-82, maps 1-10. Sept. 11, 1923.—The systematic account of the *Loti* of California is preceded by a discussion of *Lotus* versus *Hosackia*, from the historical, the morphologic, and the geographic points of view. Twenty-nine species, with varieties, are recognized, described, illustrated, and their distribution plotted. The following new varieties, names, and combinations are proposed: *L. stipularis* Greene var. *subglaber*, *L. oblongifolius* Greene var. *Torreyi* (*Hosackia Torreyi* Gray), *L. oblongifolius* var. *cupreus* (*L. cupreus* Greene), *L. grandiflorus* Greene var. *mutabilis*, *L. Wrightii* Greene var. *multicaulis*, *L. strigosus* Greene var. *hirtellus* (*L. hirtellus* Greene), *L. salsuginosus* Greene var. *brevixerillus*, *L.*

americanus Bisch. var. *minutiflorus*, *L. leucophyllus* Greene var. *Jepsonii*, *L. scoparius* (*Hosackia scoparia* Nutt.), *L. scoparius* var. *Veatchii* (*H. Veatchii* Greene), *L. scoparius* var. *dendroideus* (*Syrmatium dendroideum* Greene), *L. scoparius* var. *Traskiae* (*S. Traskiae* Eastw.), *L. scoparius* var. *brevialatus*, *L. juncus* Greene var. *Bioletti* (*L. Bioletti* Greene), *L. eriophorus* Greene var. *Heermannii* (*Hosackia Heermannii* Dur. & Hilg.), *L. Douglasii* Greene var. *nevadensis* (*H. decumbens* var. *nevadensis* Wats.), *L. Douglasii* var. *congestus*, *L. argophyllus* Greene var. *Fremontii* (*H. argophylla* var. *Fremonti* Gray), *L. argophyllus* var. *decorus* (*H. argophylla* var. *decora* Johnston), *L. argophyllus* var. *niveus* (*Syrmatium niveum* Greene), *L. argophyllus* var. *ornithopus* (*Hosackia ornithopus* Greene).—*W. A. Setchell.*

5559. RECHINGER, KARL. Studien über die Gattung *Rumex*. [Studies of the genus *Rumex*.] Ann. Naturh. Mus. Wien 36: 152–159. 1923.—The notes are in 2 parts (1) from Siebenbürgen (Transylvania) and (2) from Österreich (Austria). The following species and varieties are new: (I) *Rumex recurvatus*, Vizákna; *R. Dacicus*, Vizákna (a hybrid of *R. recurvatus* and *R. stenophyllus*); *R. crispus* L. var. *strictissimus*, Gíresau; *R. silvester* Wallr. var. *Schurii*, Heltau; *R. Toepfferi*, Neppendorf (a hybrid of *R. silvester* and *R. stenophyllus*). (II) *R. Danseri*, Schwechat (a hybrid of *R. Friesii* and *R. Patientia*); *R. Khekii*, Klosterneuburg (a hybrid of *R. crispus* and *R. Friesii*); *R. carinthiacus*, Kärnten (a hybrid of *R. obtusifolius* subsp. *subulatus* and *R. crispus*); *R. gieshüblensis*, Gieshübl (a hybrid of *R. crispus* var. *strictissimus* and *R. obtusifolius*); *R. Toepfferi*, Angern and Zwerndorf (a hybrid of *R. silvester* and *R. stenophyllus*).—*A. S. Hitchcock.*

5560. RYDBERG, P. A. Genera of North American Fabaceae I. Tribe Galegeae. Amer. Jour. Bot. 10: 485–498. Pl. 23–25. 1923.—The author revises Bentham and Hooker's classification of this tribe and proposes 11 subtribes, a key to which is given. The first 5 of these subtribes and the North American genera which are included in each are described. The Craccaeanae include *Galega*, *Cracca*, *Petieria* and some Old-World genera. The Millettianae include *Kraunhia* and some African and Asiatic genera. The Brongniartianae include *Brongniartia* and *Harpalyce* and 2 Australian genera. The Barbierianae include only *Barbieria*. The Sesbanianae include *Sesban*, *Agati*, *Daubentoniopsis*, *Glottidium*, and *Daubentonia*. *Daubentoniopsis* is a new genus, its type being *D. longifolia* (Cav.) Rydb.—*E. W. Sinnott.*

5561. RYDBERG, PER AXEL. Notes on Fabaceae. III. Bull. Torrey Bot. Club 51: 13–23. 1924.—Under *Homalobus* the "Collini" are keyed out and the following nomenclatorial changes are made: *H. Tweedyi* (*Astragalus Tweedyi* Canby), *H. Laurentii*, *H. Gibbsii* (*A. Gibbsii* Kellogg), *H. Plummerae* (*A. cyrtoides* Jones, not Gray), *H. sinuatus* (*A. sinuatus* Piper), *H. Whitedii* (*A. Whitedii* Piper), *H. subglaber* (*A. collinus* var. *subglaber* Gray), *H. speirocarpus* (*A. speirocarpus* Gray), *H. alvordiensis* (*A. alvordiensis* M. E. Jones), *H. podocarpus* (*Phaca podocarpus* Hook.), *H. bicristatus* (*A. bicristatus* Gray); and under the "Porrecti" is made the new combination *H. porrectus* (*A. porrectus* Wats.). The genus *Kentrophyta* is discussed; under it 9 species are treated, with 2 nomenclatorial changes: *K. unguolata* (*A. Kentrophyta* var. *unguolata* M. E. Jones), and *K. rotunda* (*A. tegetarius* var. *rotundus* M. E. Jones).—*P. A. Munz.*

5562. SAMUELSSON, GUNNAR. Revision der südamerikanischen Epilobium-Arten. [Revision of the South American species of *Epilobium*.] Svensk Bot. Tidskr. 17: 241–296. Pl. 2–5. 1923.—The work deals with 34 "good" species and a few doubtful ones and contains keys for determining the groups and species. All the species belong to the section *Synstigma* and none of them has been found outside of South America. All, except one Brazilian species, are Andean. They are commoner in the south Andes than in the north. Most of them have very restricted areas of distribution. The following new species and varieties are described: *E. denticulatum* Ruiz & Pavon vars. *confertum*, *aberrans*, and *macropetalum*; *E. Asplundii*; *E. meridense* Hausskn. vars. *condensatum* and *Helodes* (*E. Helodes* Lévillé); *E. aequinoctiale*; *E. assurgens*; *E. bolivianum*; *E. diminutum*; *E. hirtum*; *E. longipes*; *E. argentinum*; *E. constrictum*; *E. caesiorens*; *E. leiophyton*; *E. australe* Poepp. & Hausskn. vars. *pumilum*, *andinum* (*E. andinum* Philippi), and *Lechleri* (*E. Lechleri* Phil. & Hausskn.); *E. interruptum*; *E. deflexum*; *E. transandinum*, and *E. fragile*.—*O. Heilborn.*

5563. SMITH, CHARLES PIPER. Studies in the genus *Lupinus*. IX. *Lupinus bicolor*. Bull. Torrey Bot. Club 50: 373–387. Fig. 85–91. 1923.—A treatment is given for *Lupinus bicolor* Lindl., recognizing in addition to the typical form the following varieties: *L. bicolor*

vars. *umbellatus* (*L. umbellatus* Greene), *tridentatus* Eastwood n. var., *Pipersmithii* (*L. Pipersmithii* Heller), *microphyllus* (*L. micranthus* var. *microphyllus* Wats.), *tetraspermus* n. var., and *trifidus* (*L. micranthus* var. *trifidus* Torr.).—P. A. Munz.

FLORISTICS AND PLANT DISTRIBUTION

5564. ANONYMOUS. A year's scientific work: being the Yorkshire Naturalists Union's fifty-seventh annual report for 1918. *Naturalist* 1919: 33-43. 1919.—This report contains some additional records for flowering plants, including *Utricularia intermedia* Hayne from Strensall Common, *Juncus tenuis* Willd. from Bentham-Ingleton district, *Malaris paludosa* Sw. from Fostrow Fell, *Helleborine purpurata* Druce from West Yorkshire.—W. H. Burrell.

5565. ANONYMOUS. Conspicuous tropical plants. *Amer. Bot.* 30: 19-23. 1924.—An interesting statement is given in regard to some native plants of the Hawaiian Islands, as recorded by A. B. LYONS.—S. P. Nichols.

5566. ANONYMOUS. The quest of the blue dandelion. *Amer. Bot.* 30: 15-18. 1924.—A statement is given of personal experiences of the author with the blue dandelion.—S. P. Nichols.

5567. ANONYMOUS. The Yorkshire Naturalists Union's sixty-first annual report for 1922. *Naturalist* 1923: 25-48. 1923.—The Botanical Section has notes on blossoming and fruiting of the year, botanical survey, bryology, plant galls, mycology and micro-biology.—W. H. Burrell.

5568. ANONYMOUS. Yorkshire naturalists at Beverley. *Naturalist* 1920: 389-395. 1920.—Notes on flowering plants, mosses, and fungi are given.—W. H. Burrell.

5569. ANONYMOUS. Yorkshire naturalists at Reeth. *Naturalist* 1920: 253-258. 1920.—In this report W. H. PEARSALL has a note on moorland in the neighborhood of Reeth dominated almost entirely by *Juncus squarrosus*, a type not common in England though known to exist in Teesdale, the Lake District, and in Scotland. Characteristic associated species were *Sphagnum*, *Molinia coerulea*, *Eriophorum angustifolium*, *Vaccinium Oxycoccus*, *Scirpus caespitosus*, *Polytrichum strictum*, *Hypnum stramineum*, *H. fluitans*, *Aulacomnium palustre*. F. A. MASON notes the presence in the district of certain parasites of considerable economic importance; whole colonies of *Allium ursinum* were attacked by *Peronospora Schleideni*, and *Sphaerella Fragariae*, found on wild strawberry, causes a leaf spot feared by strawberry growers.—W. H. Burrell.

5570. ALLORGE, A. P. Contribution à l'étude de la flore normande. [Contribution to the flora of Normandy.] *Bull. Soc. Linn. Normandie* VII, 3: 288-295. 1921.—The author records species, or localities of rare species, new to the flora of Normandy.—M. Denis.

5571. ALM, CARL G. *Platanthera parvula* Schltr., en nybeskriven svensk växt. [Platanthera parvula Schltr., a new Swedish plant.] *Svensk Bot. Tidskr.* 17: 224-227. *Fig. 1.* 1923.—The Scandinavian species of *Platanthera*, hitherto known as *P. obtusata* (Banks apud Pursh) Lindl., has lately been described by Schlechter as a new species, *P. parvula* (Fedde *Reperitorium* 15: 300. 1918). The new species is clearly distinguished from the North American *P. obtusata* and is known from a few localities in arctic Sweden, Norway, and Siberia.—O. Heilborn.

5572. BONNELL, CLARENCE. The occurrence of a white form of *Tradescantia virginica* in southern Illinois. *Trans. Illinois Acad. Sci.* 12: 103. 1919.

5573. BORZA, AL. Două plante indigene ale României: *Sarothamnus scoparius* et *Spiraea salicifolia*. [On 2 indigenous plants of Roumania: *Sarothamnus scoparius* and *Spiraea salicifolia*.] *Bul. Inform. Grădinii Bot. Muz. Bot. Univ. Cluj* 2: 85-88. 1922.—The Atlantic-Mediterranean floristic element, *Sarothamnus scoparius*, was discovered in the mountains of Bihor in a spontaneous condition. The geographical range of this plant is consequently greatly extended eastward. The indigenous occurrence of *Spiraea salicifolia* must be admitted for Transsylvania, Austria, Czechoslovakia and perhaps for southern Russia.—E. Pop.

5574. CAMUS, AIMÉE. Note sur l'*Aira Cupaniana* Guss. var. *incerta* Ces. Pass. et Gib. (Graminées). [*Aira Cupaniana* var. *incerta* (Gramineae).] *Bull. Mus. Hist. Nat. [Paris]* 27: 117. 1921.—The variety (synonym *A. Cupaniana* var. *breviaristata* Asch. & Gr.) is found

rarely in Corsica and also in central France where, however, it is becoming better known. A list of localities for its occurrence in France is given.—*John M. Fogg, Jr.*

5575. CARDOT, J. Rosacées. In: LECOMTE, H. *Fl. Indo-Chine* 2: 613-680. *Fig. 57-66.* Jan., 1920.—This number is composed of a treatment of the genera from *Parinarium* to *Raphiolepis*. The following new species, varieties, and forms are included: *Prunus macrophylla* Sieb. & Zucc. var. *crassistyla*, *P. multipunctata*, *P. triflora* Roxb. var. *latifolia*, *Agrimonia Eupatoria* L. f. *pilosa* (A. *pilosa* Ledeb.).—*Fanny Fern Smith.*

5576. CROSBY, NELL. The charm of California wildflowers. *Amer. Bot.* 30: 2-4. 1924.—A brief statement is given of the common wildflowers and their abundance in various sections of California.—*S. P. Nichols.*

5577. FARWELL, OLIVER A. Notes on the Michigan Flora. Part V. *Papers Michigan Acad. Sci.* 2: 11-46. 1923.—The author lists additions to the recorded flora of Michigan with the following new names: *Thelypteris hexagonoptera* (*Polypodium hexagonoptera* Mx.); *Athyrium Filix-femina* (L.) Roth vars. *commune* (Eaton), *asplenoides* (Michx.), and f. *rubellum* (A. *Filix-femina* var. *rubellum* Gilbert); *Filix Thelypteris* (L.) Farwell var. *linearis*, and a form of this variety f. *frondosa*; *F. Dowellii* (*Dryopteris Clintoniana* × *intermedia* Dowell); *F. Benedictii* (*Dryopteris Clintoniana* × *spinulosa* Benedict); *Carex cristata* Schw. var. *catelliformis*; *C. festucacea* Schk. vars. *echinodes* (C. *straminea* var. *echinodes* Fernald), and *ferruginea* (C. *foenea* var. *ferruginea* A. Gray); *C. brevior* (Dew.) K. K. Mack. var. *pseudofestucacea*; *C. rosea* Schk. var. *minor* f. *debilis*; *Arisaema triphyllum* (L.) Torr. var. *viride* (A. *atrorubens* var. *viride* Engler); *Lethea*, proposed by Norrohn in 1790, is taken up for *Disporum* of Salisbury in 1812, with *L. Cahnae*, *L. oregana* (*Prosartes oregana* S. Wats.) and *L. trachycarpa* (*Prosartes trachycarpa* S. Wats.); *Polygonum pennsylvanicum* L. f. *albineum*; *Syndesmon thalictroides* (L.) Hoffing. var. *bitermum*, also f. *oppositifolium*, f. *unipediculum*, and f. *uniflorum* (*Anemone thalictroides* var. *uniflora* Pursh); *Cheirinia parviflora* (*Erysimum parviflorum* Nutt., *E. syrticum* Sheldon); *Rosa virginiana* Mill. var. *grandiflora* (Baker) (R. *obovata* Raf.); *R. virginiana* var. *glandulosa* (Crepin) (R. *serrulata* Raf.); *Acalypha virginica* L. f. *purpurea*; *Viola domestica* Bicknell var. *communis* (V. *communis* Pollard, V. *pratincta* Greene, V. *familiaris* Greene), of which f. *alba* (*Viola cucullata* var. *alba* T. & G.) is recognized; *V. pubescens* Ait. f. *eriocarpa* (V. *pubescens* var. *eriocarpa* Nutt.); *V. pubescens* Ait. var. *scabriuscula* T. & G. f. *leiocarpa* (V. *eriocarpa* Schw. var. *leiocarpa* Fernald & Wiegand); *V. tricolor* L. f. *tenella* (V. *tenella* Muhl., V. *Rafinesquii* Greene); *Daucus Carota* L. f. *epurpurata*; *Vaccinium vacillans* Kalm. f. *rosea*; *Oxycoccus Oxycoccus* (L.) MacM. var. *intermedium* (*Vaccinium Oxycoccus* L. var. *intermedium* A. Gray); *Asclepias tuberosa* L. f. *flavescens*; *Convolvulus incanus* Vahl var. *glabratus*; *Verbena hastata* L. var. *paniculata* (Lam.) Farwell f. *rosea*; *Koellia virginica* (*Satureja virginica* L.); *Solanum Dulcamara* L. var. *pubescens* R. & S. f. *albiflora*; *S. Dulcamara* L. var. *pubescens* R. & S. f. *albiflora*; *S. Dulcamara* L. var. *canescens*; *Erigeron ramosus* (Walt.) BSP. var. *integrifolius* (E. *integrifolium* Bigel.); *Ridax alternifolius* (L.) Britton var. *oppositifolius* (*Actinomeris squarrosa* var. *oppositifolia* (Fresen.) T. & G.); *Lactuca canadensis* L. var. *longifolia* (Mx.) (L. *elongata* var. *longifolia* T. & G.), with the f. *albocaerulea* (L. *canadensis* var. *albocaerulea* Farwell); *L. canadensis* var. *laciniata*; *L. canadensis* var. *elongata* (L. *elongata* Muhl.).—*Ernst A. Bessey.*

5578. GAGNEPAIN, F. Combrétacées, Gyrocarpacées, Myrtacées. In: LECOMTE, H. *Fl. Indo-Chine* 2: 734-824. *Fig. 76-89.* Oct., 1920.—The present number includes a treatment of the genera from *Combretum* to *Quisqualis* in the Combretaceae; *Illigeria* and *Gyrocarpus* in the Gyrocarpaceae; and from *Baeckea* through *Rhodomyrtus*, and *Eugenia* in part in the Myrtaceae. The following new varieties are included: *Combretum quadrangulare* Kurz. var. *lanceolatum*, *Terminalia Chebula* Retz. vars. *citrina* (T. *citrina* Roxb.) and *nana*; *T. nigrovenulosa* Pierre var. *gracilior*, *Tristania burmannica* Griffith var. *rufescens* (T. *rufescens* Hanc).—*IBID.* 825-864. *Fig. 89-95.* May, 1921.—In this number the treatment of the genus *Eugenia* is concluded, and the work is continued to the genus *Barringtonia*. The following new names and varieties are included: *Eugenia laosensis* Gagnep. var. *quocensis*, *E. Jambos* L. var. *sylvatica*, *E. formosa* Wall. var. *ternifolia* (E. *ternifolia* Roxb.), *E. javanica* Lamk. var. *Balansae*, *E. malayana* (*Jambosa confusa* Bl.).—*Fanny Fern Smith.*

5579. GAGNEPAIN, F. Crassulacées et Droseracées. In: LECOMTE, H. *Fl. Indo-Chine* 2: 697-709. *Fig. 71-73.* Oct., 1920.—The author treats the genera *Byrophyllum* and *Kallanchoe*,

of the Crassulaceae; and *Drosera*, of the Droseraceae. No new species, varieties, or combinations are included.—*Fanny Fern Smith*.

5580. GAGNEPAIN, F. **Legumineuses: Papilionées (fin).** [Leguminosae: Papilionaceae (end).] In: LECOMTE, H. **Fl. Indo-Chine 2:** 505-613. *Fig. 48-56.* Jan., 1920.—The present number concludes the treatment of the genus *Sophora* and continues to the genus *Murtonia*. The following new species, varieties, and combinations are included: *Sophora violacea* Thw., var. *pilosa*. *Lepedeza Bonii* (*Campylotropis Bonii* Schindler), *L. Henryi* (*C. Henryi* Schindler), *L. splendens* (*C. splendens* Schindler), *Lourea obcordata* Desv. var. *reniformis* (*Hedysarum reniforme* Lour.), *Desmodium lanceolatum* Schindler (*Lepedeza lanceolata* Dunn).—*Fanny Fern Smith*.

5581. GAGNEPAIN, F. **Saxifragacées.** In: LECOMTE, H. **Fl. Indo-Chine 2:** 682-695. *Fig. 67-69.* Oct., 1920.—The present number includes a treatment of the genera from *Polyosma* to *Penthorum*. *Dichroa hirsuta* and *D. hirsuta* f. *variegata* are new.—*Fanny Fern Smith*.

5582. GAGNEPAIN, F., ET A. GUILLAUMIN. **Cryptérionacées.** In: LECOMTE, H. **Fl. Indochine 2:** 695-697. *Fig. 70.* Oct., 1920.—The single genus *Crypteronia* is treated. No new species, varieties, or combinations are included.—*Fanny Fern Smith*.

5583. GATES, FRANK C. **Extensions of range of plants in the Douglas Lake region, Cheboygan County, Michigan.** Papers Michigan Acad. Sci. 2: 47-48. 1923.—Brief notes are given on 4 plants markedly out of their generally reported range: *Grindelia squarrosa* (Pursh) Dunal, *Sibbaldiopsis tridentata* (Solander) Rydb., *Sagittaria cristata* Engelm., and *Oenothera Oakesiana* Robbins.—*Ernst A. Bessey*.

5584. GROFF, G. W., EDWARD DING, AND ELIZABETH H. GROFF. **An enumeration of the McClure collection of Hainan plants.** Lingnaam Agric. Rev. 1: 27-86. 1923.—This is the 1st of a series of articles recording the plants of the island of Hainan. The present installment lists the plants from the Hymenophyllaceae to the Lauraceae inclusive, and the sequence followed is that of Engler & Prantl's *Natürlichen Pflanzenfamilien*. No descriptions are given, but the locality, collector's numbers, and Chinese name are associated directly with the scientific name of each species.—*J. M. Greenman*.

5585. GUILLAUMIN, A. **Contributions à la flore de la Nouvelle-Calédonie.** [Contributions to the flora of New Caledonia.] Bull. Mus. Hist. Nat. [Paris] 27: 119-125. 1921.—XXXIV. **Plants collected by M. Franc (continued).** This report mentions 119 plants representing 23 families, most important among which are Meliaceae, Sapindaceae, Leguminosae, Saxifragaceae, Myrtaceae, and Araliaceae. *Moorea aquarum* and *Licania gerontagea* Schltr. var. *Francii* are described as new, and *Pancheria Seberti* is proposed as a new name for *P. ternata* Panch. & Seb., not *P. ternata* Brong. & Gris.—*John M. Fogg, Jr.*

5586. GUILLAUMIN, A. **Hamamelidacées, Haloragacées, Callitrichacées, Rhizophoracées.** In: LECOMTE, H. **Fl. Indo-Chine 2:** 709-734. *Fig. 74-75.* 1920.—The author treats the genera *Eustigma*, *Altingia*, and *Liquidambar* in the Hamamelidaceae; *Haloragis* and *Myriophyllum* in the Haloragaceae; *Callitriche* in the Callitrichaceae; and the genera from *Rhizophora* to *Corallia* in the Rhizophoraceae. There are no new species, varieties, or combinations included.—*Fanny Fern Smith*.

5587. HÅRD AV SEGERSTAD, F. **Juncus Kochii F. Schultz dess systematiska rang och växtgeografiska ställning.** [Juncus Kochii, its systematic rank and phytogeographic position.] Svensk Bot. Tidskr. 17: 143-153. *Fig. 1-3.* 1923.—This species is habitually very similar to *Juncus lamprocarpus* but systematically it comes nearer to *J. supinus*. It differs from these species in characters of the fruit, in having 6 stamens, and in some vegetative characters. The first botanist to observe it was E. Fries, who, however, regarded it as a variation of *J. supinus*. Later it was described by Koch and by Schultz. Undoubtedly it deserves the rank of a species, especially as it has a specific geographical distribution. It is an Atlantic species, found in Scandinavia only on the west and south coast of Norway, in Denmark and at 3 places in southwest Sweden. Two of the latter localities were found by the author. A list of synonyms is given.—*O. Heilborn*.

5588. HEATH, FANNIE MAHOOD. **The Pasque flower.** Amer. Bot. 30: 1-2. 1924.

5589. HJELT, HJALMAR. **Conspectus Florae Fennicae.** [A Synopsis of the Flora of Finland.] Acta Soc. Fauna et Flora Fennica 41: 1-502. 1915-1919.—The author presents a review of the flora as to distribution with biographical notes, enumerating the genera and the

species in the following families: (1) Rosaceae: *Pirus*, 4, *Sorbus*, 8, *Crataegus*, 7, *Amelanchier* 1, *Cotoneaster*, 4, *Rubus*, 27, *Fragaria*, 9, *Comarum*, 1, *Potentilla*, 35, *Sibbaldia*, 1, *Alchemilla*, 19, *Dryas*, 1, *Geum*, 7, *Agrimonia*, 3, *Sanguisorba*, 2, *Spiraea*, 7, *Ulmaria*, 2, *Prunus*, 9. (2) Papilionaceae: *Cicer*, 1, *Pisum*, 2, *Lathyrus*, 12, *Vicia*, 18, *Phaseolus*, 3, *Astragalus*, 8, *Phaca*, 2, *Oxytropis*, 4, *Hedysarum*, 3, *Caragana*, 2, *Ornithopus*, 2, *Onobrychis*, 2, *Coronilla*, 2, *Lotus*, 1, *Tetragonolobus*, 2, *Medicago*, 10, *Trigonella*, 2, *Melilotus*, 6, *Trifolium*, 14, *Genista*, 2, *Cytisus*, 3, *Lupinus*, 3, *Ononis*, 4, *Amorpha*, 1, *Anthyllis*, 3. (3) Ericaceae: *Myrtillus*, 3, *Vaccinium*, 2, *Oxycoccus*, 2, *Arctostaphylos*, 2, *Andromeda*, 4, *Erica*, 1, *Calluna*, 1, *Phyllodoce*, 1, *Loiseleuria*, 1, *Rhododendron*, 1, *Ledum*, 1, *Pyrola*, 9, *Monotropa*, 2. (4) Primulaceae: *Lysimachia*, 4, *Trientalis*, 1, *Samolus*, 1, *Anagallis*, 2, *Centunculus*, 1, *Glauz*, 1, *Primula*, 11, *Androsaces*, 2, *Hottonia*, 1. (5) Plumbaginaceae: *Armeria*, 2. (6) Convolvulaceae: *Convolvulus*, 3, *Cuscuta*, 3. (7) Polemoniaceae: *Polemonium*, 4, *Diapensia*, 1. (8) Hydrophyllaceae: *Nemophila*, 2, *Phacelia*, 1. (9) Asperifoliae: *Myosotis*, 13, *Lithospermum*, 3, *Pulmonaria*, 2, *Nonnea*, 1, *Borrago*, 1, *Symphytum*, 3, *Echium*, 1, *Anchusa*, 2, *Mertensia*, 1, *Cynoglossum*, 1, *Paracaryum*, 1, *Echinosperrum*, 2, *Asperugo*, 1. (10) Solanaceae: *Solanum*, 9, *Hyoscyamus*, 1, *Datura*, 2, *Nicotiana*, 2.—*Olga Lakela*.

5590. JENSEN, P., EN W. H. WACHTER. *Floristische Aanteekeningen XX, Festuca*. [Floristic notes XX, Festuca.] Nederland. Kruidk. Arch. 1922: 166-174. 1922 [1923].—A critical study and occurrence of different forms of *Festuca ovina* and *F. rubra* in the Netherlands are recorded.—*J. C. Th. Uphof*.

5591. JEANPERT, E. *Énumération de plantes d'Orient*. [Plants from the Orient.] Bull. Mus. Hist. Nat. [Paris] 26: 666-667. 1920.—The author gives a list of plants, received by the Museum, which were collected during the war in Macedonia, Greece, and the Dardenelles. Chief among the localities represented are Bilzanik, Gola, Harmaneni, Likovan, Moravca, Zeitenlik, and Ertoghul.—*John M. Fogg, Jr.*

5592. KLOOS, A. W., JR. *Aan winsten van de Nederlandsche Flora in 1921*. [Additions to the flora of the Netherlands in 1921.] Nederland. Kruidk. Arch. 1922: 149-165. 1 fig. 1922 [1923].

5593. MAFFEI, LUIGI. *Aggiunte alla flora Pavese*. [Additions to the flora of Pavia.] Atti Ist. Bot. Univ. Pavia II, 18: 136-150. 1921.—Seventy-five species, both monocotyledonous and dicotyledonous, reported for the 1st time from the district of Pavia, Italy, are listed, along with ecological notes. A bibliography of the Pavian flora is also given.—*P. D. Caldis*.

5594. MAIDEN, J. H. *The forest flora of New South Wales*. Vol. VIII. Pt. 5. P. 61-70, pl. 284-287, photo. illus. 3. Alfred James Kent: Sydney, 1923.—The present number includes descriptions and illustrations of the following plants: *Capparis nobilis* F. v. M., *Eucalyptus Benthami* Maiden & Cambage, *Pseudomorus Brunoniana* Bur., and *Arytera divaricatum* F. v. M.—*J. M. Greenman*.

5595. NEWBOLD, PATTY THUM. *Notes on some foreign crab-grasses*. Torreyia 24: 8-9. 1924.—The author regards *Syntherisma* as the oldest valid name for the crab-grasses, and transfers to that genus the following foreign species that have been introduced for experimental purposes by the U. S. Department of Agriculture: *Panicum abyssinicum* Hochst., *P. parviflorum* R. Br., *P. Royleanum* Nees, *P. uniglume* A. Rich., *Digitaria eriantha* Steud., *D. Henryi* Rendle, *D. iburua* Stapf, *D. nodosa* Parl., *D. puberula* Link, *Paspalum exile* Kippist, and *Cynodon ternatus* A. Rich.—*J. C. Nelson*.

5596. PELLEGRIN, F. *Plantae Letestuanæ novæ ou Plantes nouvelles récoltées par M. Le Testu de 1907 à 1919 dans le Mayombe congolais*. [Plants collected by Le Testu in Mayumba, (French) Congo.] Bull. Mus. Hist. Nat. [Paris] 26: 654-659. 1920.—This, the first part of a report on 2,400 plants collected by Le Testu in the region of Tchibanga, and the valley of the Nyanga, deals with the Anonaceae, and describes 2 new genera and 6 new species, as follows: *Letestudoxa* n. gen., *L. bella* and *L. grandifolia*; *Pseudartabotrys* n. gen., with *P. Le Testui*; *Isolona Le Testui*; *Xylopia Le Testui*; *Uvaria Le Testui*.—*John M. Fogg, Jr.*

5597. PITARD, J. *Rubiacées*. In: LECOMTE, H. *Fl. Indo-Chine* 3: 20-144. Fig. 3-14. Dec., 1922.—The author treats the genera from *Sarcocephalus* through *Xanthophytum* and *Oldenlandia* in part. The following new genera, species, varieties, and combinations are included: *Sarcocephalus officinalis* Pierre, *S. ovoideus*, *Anthocephalus indicus* A. Rich. var. *macrophylla* Pierre, *Adina globiflora* Salisb. var. *tonkinensis*, *Paradina* Pierre. n. gen., *P.*

hirsuta (*Mitragyne hirsuta* Havil.), *Uncaria rostrata* Pierre, *Coptosapelta flavescens* Korth. var. *dognaiensis* Pierre, *C. laotica*, *Hymenodictyon excelsum* Wall. vars. *subglabrum* Pierre, *canescens* Pierre, *velutinum* Pierre, *Wendlandia ferruginea* Pierre, *W. Thorelii*, *W. cambodiana*, *W. laotica*, *W. paedicalyx*, *W. tonkiniana*, *W. photinifolia* Pierre, *Mouretia* n. gen., *M. tonkinensis*, *Dentella repens* Forst. var. *grandis* Pierre, *Argostemma cambodianum*, *A. bariense* Pierre, *Spiradiclis leptobotrya* (*Ophiorrhiza leptobotrya* Drake), *Notodontia* Pierre n. gen., *N. micrantha* (*Ophiorrhiza micrantha* Drake), *N. Balansae*, *Paedicalyx* Pierre n. gen., *P. attopovens* Pierre, *Xanthophytopsis* n. gen., *X. Balansae*, *Xanthophytum polyanthum*, *Oldenlandia rudis* Pierre, *O. rudis* var. *mollis*, *O. microcephala* Pierre, *O. pressa* (*O. Auricularia* K. Schum. var. *procumbens* O. Kze.), *O. Auricularia* K. Schum. var. *macrophylla*, *O. valida* Pierre, *O. symplociformis* Pierre, *O. pinifolia* O. Kze. vars. *macrocalyx* (*O. macrocalyx* Pierre) and *horridula* (*O. horridula* Pierre), *O. connata* K. Schum, var. *glabrescens* Pierre, *O. stipulata* (*Hedyotis stipulata* Br.), *O. umbrosa* Pierre, *O. monocephala* (*H. monocephala* Br.), *O. oligocephala* Pierre, *O. succosa* Pierre, *O. ruelliformis* Pierre, *O. pruinosa* O. Kze. var. *Massiei*, *O. kamputensis*, *O. Lecomtei*, *O. justiciformis* Pierre, *O. Wallichii* (*Hedyotis Wallichii* Kurz), *O. scoparia* Pierre, *O. praecox* Pierre, *O. ternata* Pierre, *O. laotica*, *O. valerianelloides*, *O. Chevalieri*, *O. uncinella* O. Kze. var. *mekongensis* Pierre, *O. pinifolia* O. Kze., *O. rosmarinifolia*, *O. grandis*, *O. fraterna* Pierre, *O. leptoneura*, *O. tonkinensis* (*Hedyotis uncinella* Drake), *O. multiglomerulata* (*H. uncinella* Drake), *O. multiglomerulata* var. *linearifolia*, *O. macrosepala*, *O. macrosepala* vars. *integra*, *repoeuensis* (*O. uncinella* var. *repoeuensis* Pierre), and *scabra*, *O. peduncularis* (*Hedyotis peduncularis* King), *O. Havilandi* (*H. Havilandi* King), *O. Massiei*, *O. quocensis* Pierre, *O. Robinsii*, *O. Mouretii*, *O. rigidula* Pierre, *O. pilulifera*, *O. capitellata* Kuntze vars. *mollis* Pierre, *mollissima*, *glabra* (*H. capitellata* Wall.), *pedicellata*, *pubescens* and *ovioidea* (*H. macrostemon* Drake), *O. contracta* Pierre (*H. macrostemon* Drake), *O. krewanhensis* Pierre, *O. chereevensis* Pierre, and *O. Pierrei*.—Fanny Fern Smith.

5598. REAGAN, ALBERT B. **Some plants of the Bois Fort Indian Reservation and vicinity in Minnesota.** Trans. Illinois Acad. Sci. 14: 61-70. 1921.—Portions of this region are practically in the virgin state. A list of the flowering plants collected and classified by the author is presented in tabular form according to families. Notes are given on the economic plants and especially Indian use of these plants.—H. W. Anderson.

5599. SAMUELSSON, GUNNAR. **Floristiska fragment. III.** Svensk Bot. Tidskr. 16: 35-59. 1922.—A discussion is given of the nomenclature of *Alisma Plantago* L., *Bromus Benekeni* (Lge.) Syme, *Bromus ramosus* Huds., *Montia verna* Neck., with notes and maps on their occurrence in Sweden, Norway, and Denmark.—W. W. Gilbert.

5600. SAMUELSSON, GUNNAR. **Floristiska fragment. V.** Svensk Bot. Tidskr. 17: 129-142. 1923.—The author describes *Equisetum arvense* L. × *pratense* Ehrh. from a Swedish locality. It is very similar to *E. arvense* var. *nemorosum* A. Br. but has imperfect spore production. Sterile *Butomus umbellatus* L. is reported from the interior of northern Norway (Finnmarken). It must have come from Sweden or Finland and is most probably a relic from the warm post-glacial period. A critical study is made of *Dactylis Aschersoniana* Graebn. This is a little-known species, found in some places in central Europe, Denmark, and south Sweden (also, introduced, in North America). It is clearly distinct from *D. glomerata* L. but hybridizes with the latter when both occur together. A specimen of *Triticum caninum* L. × *violaceum* Horn. is described from Swedish Lapland. *Rumex fennicus* Murb. and *R. odontocarpus* (Sándor) Borb. are reported as new for Sweden, the latter undoubtedly having been introduced by man. Some localities for *Actaea erythrocarpa* (Turcz.) Fisch. are given from north Sweden; and 1 locality, also from north Sweden, for *Rubus arcticus* L. × *idaeus* L. The last mentioned has only once before been found, viz., in Finland.—O. Heilborn.

5601. SOEST, J. L. VAN. **Flora van Arnhem I.** [Flora of Arnhem I.] Nederland. Kruidk. Arch. 1922: 65-96. 1922. [1923].—The treatise contains representatives of the Ericaceae to the Verbenaceae around Arnhem, Netherlands.—J. C. Th. Uphof.

5602. STEINECKE, F. **Die Flora der Granattrichter im Ainse-Gebiet (Frankreich).** [The flora of the garnet gulch in the Ainse (France).] Bot. Archiv 2: 207-210. 1922.

5603. SWEETSER, ALBERT R. **Common wild flowers of Crater Lake National Park.** Oregon Out-Of-Doors 1: 29-58. 1922.—The author describes in popular language a few of the

native flowering plants of the Crater Lake region of Oregon. The descriptions are accompanied by illustrations reproduced from photographs.—*J. M. Greenman.*

5604. TRELEASE, WM. The Jack oak (*Quercus ellipsoidalis*). Trans. Illinois Acad. Sci. 12: 108–118. 6 pl., map. 1919.—The characters of this oak are discussed and the forms *intermedia* Vasey, *depressa* Vasey, *coronata* Vasey, and *heterophylla* Trel. recognized and distinguished. The distribution of the species is given in detail.—*Geo D. Fuller.*

5605. TURRILL, W. B. Botany of Juan Fernandez and Easter Island. Kew Bull. 1922: 159. 1922.—These remarks are based on The Natural History of Juan Frenandes and Easter Island, edited by CARL SKOTTESBERG, vol. 2, 1922. This publication has the following papers: Die Gasteromyceten der Juan Fernandez und Osterinseln, by T. C. E. FRIES; Fresh Water Algae from Juan Fernandez and Easter Island, by K. MÜNSTER STROM; and a paper on the phanerogams of each of these islands by Skottsberg. The high percentage of endemic phaeerogams is remarkable—69% on Juan Fernandez.—*T. J. Fitzpatrick.*

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

S. F. TRELEASE, *Editor*

5606. BRADFORD, S. C. An improved electric thermostat constant to 0.02°. Biochem. Jour. 16: 49–52. 1 pl. 1922.—This simple thermostat, sensitive to 0.02°C. and easily constructed in the laboratory, is described in detail.—*A. R. Davis.*

5607. BROCHER, FRANK. Remarques sur le Dessin d'Histoire naturelle, particulièrement sur celui à la Chambre-claire. [Remarks on nature study drawing, especially with the aid of the camera-lucida.] Ann. Biol. Lacustre 12: 15–40. 1923.—An explanation is given of the theory of the camera-lucida, with consideration of the various forms of the instrument and their practical uses.—*N. Carter.*

5608. CHATTON, EDOUARD. Technique de double inclusion à l'agar et à la paraffine pour microtomie, avec orientation ou en masse, d'objets très petits. [Technique of double inclusion, for very small objects, either oriented or en masse, in agar and paraffin for microtomy.] Compt. Rend. Soc. Biol. 88: 199–202. 1923.

5609. FRIEDRICH, ADOLF. Kulturtechnischer Wasserbau. [Agricultural hydraulic engineering.] 4th ed., 8vo, xvi + 652 p., 20 pl., 496 fig. P. Parey: Berlin, 1923.—Volume I of this work treats of drainage and irrigation.—*F. Weiss.*

5610. GULIK, D. VAN. Over Nachtvorst. [Nightfrost.] Mededeel. Landbouwhoogeschool Wageningen 27^e: 1–16. 1923.

5611. JAEGER, F. M. La symétrie dans la nature. Scientia 34: 379–392. 1923.—In considerable part, this ground is covered in the author's Lectures on the Principle of Symmetry, 2nd ed., Amsterdam, 1920 (a French edition is announced as soon to appear). By a "rapid and incomplete sketch," the author hopes to show the great importance of his subject "in all fields of the exact and natural sciences;" but he records no new botanical findings. The paper presents very simply the nature of the mathematical determination of symmetrical figures, with certain inorganic instances.—*F. T. Lewis.*

5612. LUTZ, ADOLPHE. Contribution aux methodes d'observations microscopiques et biologiques. [A contribution to methods of biological and microscopic observation.] Ann. Biol. Lacustre 11: 90–102. 1922.—A description is given of a method for mounting in capillary tubes objects too large for mounting in the ordinary way on a glass slide under a cover glass. The tubes can be used for macroscopic or microscopic observation and even with the oil-immersion lens. There is also an account of the use of phenol as a preservative and as a clearing agent, etc., chiefly as used by the zoologist.—*N. Carter.*

5613. METCALF, MAYNARD M. Research and the American college. Science 59: 23–27. 1924.

5614. STEAD, D. G. Our natural history and wild flower exhibition. Australian Nat. 5: 156–161. 1924.

5615. WIESNER, JULIUS VON. Die Rohstoffe des Pflanzenreiches. [The raw materials of plants.] Vol. 3. 1014 p., 331 fig. Wilhelm Engelmann: Leipzig, 1921.—The 3rd volume of this widely known work contains information concerning all important groups of plant prod-

ucts. (1) In a chapter on fibers, p. 1-405, over 500 fiber-producing plants are described; of these, 45 are described in considerable detail, as to properties, preparation, and marketing. (2) A chapter on products of subterranean plants, p. 405-489, treats 320 species, 13 in detail. (3) A chapter on leaves and herbs, p. 490-596, includes about 250 species, 13 in detail. (4) A chapter on flowers and floral parts, p. 577-661, describes 102 species, 11 in detail. (5) A chapter on seeds, p. 662-790, gives an account of 123 species, 16 in detail. (6) A chapter on fruits, p. 791-911, refers to 158 species, 18 in detail. The last chapter, p. 912-948, is devoted entirely to yeasts. The entire work forms a comprehensive treatise, dealing with practically all raw materials of plants.—*J. C. Th. Uphof.*

